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OBSERVATIONS
ON THE
FORMATION AND MANAGEMENT
OF
USEFUL AND ORNAMENTAL PLANTATIONS;
ON THE
THEORY AND PRACTICE
OF
LANDSCAPE GARDENING:
AND ON
GAINING AND EMBANKING LAND
FROM RIVERS OR THE SEA.

ILLUSTRATED WITH PLATES.

BY J. LOUDON,
LANDSCAPE GARDENER, &c.

EDINBURGH:
Printed for
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1804.

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Craig's Close, Edinburgh.

TO

THE KING.

SIRE,

Two conſiderations emboldened me to requeſt the honour of laying the following Obſervations before Your Majesty.

Your Majesty has long been a cheriſher and protector of the polite and uſeful arts. Thoſe treated of in this volume are confeſſedly of the greateſt importance for the ornament of Your dominions, and the defence and proſperity of the Britiſh Empire.

The DESIGNS, &c. which I had the honour to make for laying out the grounds of Her Royal Highneſs the DUTCHESS OF BRUNSWICK, gave ſo much ſatisfaction, that after having pleaſed one ſo well qualified to judge, and ſo nearly related to Your MAJESTY, I conſidered myſelf as having ſome claim to Your patronage on that account.

Under Your MAJESTY's patronage, theſe ſheets demand the attention of the Public, while the author, in the exerciſe of his profeſſion,

feſſion, ſhall endeavour to merit the honour conferred.

That Your MAJESTY may long live to ſee the Arts flouriſh, and the Britiſh nation happy, is the ſincere wiſh of,

May it pleaſe Your MAJESTY,
Your MAJESTY's
Obedient humble Servant
And Subject,

J. LOUDON.

EDINBURGH,
October 1804.

PREFACE.

THE greater part of the following Obſervations were written in London early in 1803, not long after I had commenced buſineſs as landſcape-gardener, &c. My intention was to give the Public ſome knowledge of my ideas in thoſe arts which I was about to practiſe, which, in many particulars, are different from thoſe of other landſcape gardeners. I was deterred, however, from publiſhing, as all my time was ſoon taken up, by the employment which I was honoured with from ſome diſtinguiſhed perſonages in England and on the Continent. The following year I was called into Scotland, where I have been principally detained for ſome months paſt by ſeveral noblemen and gentlemen, who have kindly favoured me with their employment—to direct or give deſigns for laying out their places—planting—managing their woods—draining, or otherwiſe improving their eſtates—or in enlarging their extent, by gaining land from the ſea.

With reſpect to the ideas contained in the following pages, I ſhall only obſerve, that in general they are ſuch as appear to me not properly underſtood by practical men. The ſheets being now returned from the Preſs, I find that the ſtyle in which I have endeavoured to convey thoſe ideas to the reader is far from being ſuch as I could wiſh. In the way of apology, I can only plead my inexperience as an author, and the nature of my profeſſion, which tends to make the mind more converſant with things than words. I ſhall certainly make conſiderable alterations in the language, if ever this work come to a ſecond edition.

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* A miſtake for SECT. II. which occaſions an erroneous enumeration of the ſubſequent Sections.

OBSERVATIONS

ON

THE FORMATION AND MANAGEMENT OF USEFUL AND ORNAMENTAL PLANTATIONS.

INTRODUCTION.

VARIOUS are the vegetable productions which this earth affords. Blades of graſs ſpring up every where, and clothe the ſurface with paſture; groups of ſhrubs ariſe in ſome places, and diverſify this uniform covering; but trees are the moſt ſtriking objects that adorn the face of inanimate nature. If we imagine for a moment that the ſurface of Europe were totally diveſted of wood, what would be our ſenſations on viewing its appearance? Without this accompaniment, hills and vallies, rivers and lakes, rocks and cataracts, all of themſelves the moſt perfect that could be imagined, would preſent an aſpect bleak, ſavage, and uninteresting. But, let the mountains be covered with wood, and the water ſhaded by trees, and the ſcene is inſtantly changed: what was before cold and barren, is now rich, noble, and full of variety. In traveling through a naked country, a whole unvaried horizon is comprehended by the eye with a ſingle glance; its ſurface is totally deſtitute of intricacy to excite curioſity and fix attention; and both the eye and the mind are kept in a ſtate of perpetual wearineſs and fatigue. But in a wooded country, the ſcene is continually changing; the trees form a varied boundary to every thing around, and enter into numberleſs and pleaſing combinations with all other objects; the eye is relieved without diſtraction, and the mind fully engaged without fatigue. If we examine even a tree by itſelf, the intricate formation and diſpoſition of its boughs, ſpray and leaves, its varied form, beautiful tints, and diverſity of light and ſhade, make it far ſurpaſs every other object; and, notwithſtanding this multiplicity of ſeparate parts, its general effect is ſimple and grand.

But wood is not only the greateſt ornament on the face of our globe, but the moſt eſſential requiſite for the accommodation of civilized ſociety. The implements of agriculture, the machinery of manufactures, and the vehicles of commercial intercourſe, are all made of timber; nor is there an edifice or ſuperſtructure of almoſt any denomination, in which this material does not form the principal part.

Wood is more particularly valuable in Great Britain, where the exiſtence and proſperity of the Empire depends upon the ſupport of a numerous ſhipping, emphatically called its ‘ wooden walls.’

From the univerſal utility, and the unrivalled beauty of wood, it may reaſonably be ſuppoſed to have been aſſiduouſly cultivated in all improved countries; and, accordingly, we find trees were planted, and the growth of timber encouraged, by every poliſhed nation. To this ſubject, as to all other parts of rural œconomy, the Romans paid great attention; and the writings of ſome of their moſt celebrated authors, contain many excellent obſervations and precepts, on the culture and management of timber and ornamental trees.

Planting has been more or leſs a prime object in this iſland for more than two centuries paſt; but until the improvements in agriculture and the arts, the increaſe of our ſhipping, and the more general introduction of luxuries took place, there was no immediate inducement to plant, and ſtill leſs knowledge in the art of planting. In conſequence of an increaſing conſumption, the value of timber was enhanced; and as the number of acres planted did not keep pace with the number annually cut down, a proper ſupply of this article for the market, was not to be had, and ſtill is wanting. Timber of all kinds is daily advancing in price; and, from the great number of King's ſhips,*

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* ‘ A ſeventy-four gun ſhip (we ſpeak from good
‘ authority) ſwallows up 3000 loads of oak timber.
‘ A load of timber is 50 cubical feet; a ton 40 feet;
‘ conſequently, a ſeventy-four gun ſhip takes 2000 large
‘ well grown timber trees; namely, trees of nearly
‘ two tons each!

‘ The diſtance recommended by authors for planting
‘ trees in a *wood*, in which underwood is alſo propagated,
‘ is thirty feet or upwards. Suppoſing trees
‘ to ſtand at two roods (33 feet, the diſtance we recommend
‘ they ſhould ſtand at, in ſuch a plantation) each
‘ ſtatute acre would contain 40 trees; conſequently,
‘ the building of [illegible] ſeventy-four gun ſhip, will clear of
‘ ſuch woodland, the timber of 50 acres.'—*Planting and Rural Ornament*, p. 111.

merchantmen and other craft, that have lately been built, in connexion with the wretched management of the Royal foreſts, oak timber fit for the purpoſes of naval architecture has become alarmingly ſcarce; and ſhould Great Britain become dependent on other powers for the means of ſupporting her Navy, every lover of his country muſt tremble for the conſequence. †

Thus, Noblemen and Gentlemen are preſented with the moſt powerful motives to plant, both of a public and private nature. Trees are beautiful objects, the greateſt ornament to individual places, and the nobleſt improvement of a country. Timber is a valuable article, it affords great gain to the individual, while it is the ſource and ſupport of the character and dignity of the Britiſh Empire.

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† See the report given in by the Commiſſioners appointed by Parliament, ſome years ago, to inquire into the ſtate of the Royal foreſts.

But, independently of the beauty and profit of wood, the *pleaſure* attending the formation and management of plantations, will be a conſiderable recommendation to every virtuous mind. We look upon our young trees as our offspring; and nothing can poſſibly be more ſatisfying than to ſee them grow and proſper under our care and attention; nothing more intereſting than to examine their progreſs, and mark their ſeveral peculiarities. As they advance to perfection, we foreſee their ultimate beauty; and the conſideration that we have reared them, raiſes a moſt agreeable train of ſenſations in our minds; ſo innocent and rational, that they may juſtly rank with the moſt exquiſite of human gratifications.—But, as the moſt powerful motives to planting are thoſe which addreſs themſelves to the intereſt of the individual, I proceed to conſider it more particularly in this point of view.

The great profits which ariſe from planting, have been taken notice of by many writers*; and if we look into their works, we ſhall find, of clear profit, in different inſtances, all the intermediate ſums between forty ſhillings and three hundred pounds Sterling *per* acre † yearly; and this annual return commences, in ſome kinds of plantations, the ſecond or third year after planting (ſuch as oſier plantations, which in many places yield from 15 to 30l. *per annum*) or in ten, fifteen, or twenty years, as coppices or fir groves, which are very profitable kinds of plantations; but the higheſt ſums can only be expected to commence thirty or forty years, or more, after planting; and even then, the value of other products is included in connexion with the timber, as the reſin of the pine and fir tribe, the bark of the oak, &c. In

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[*] See Du Hamel's Works; Mr A. Young's Tours; Hunter's Evelyn's Sylva; Agricola on Timber Trees; and a great many other writers.

[†] The Engliſh or ſtatute acre is always underſtood here.

In general, however, it may be ſafely aſſerted, that no kind of plantation, if properly made and kept, will be longer of yielding returns than ten years; and that ſome annual profit will be obtained more or leſs afterwards, from the thinnings and prunings, until the trees ſhall be finally cut down.

From the various authors who have made theſe meaſurements and calculations, and alſo in a number of places both in England and Scotland, there is the moſt concluſive evidence that planting is equally profitable with agriculture, except perhaps in particular circumſtances; and, what is of great importance too, it is commonly moſt ſo in lands not adapted for the general purpoſes of huſbandry, ſuch as dells, ſteep banks, rocky precipices, and even heaths and moors*;

---

* At Dunkeld and Taymouth, and many other places in the north of Scotland, there are larches growing in ſuch ſituations, from forty to fifty years old, which, if cut down now, would pay upwards of 8ol. each acre *per annum* ſince they were planted.

for deep rich ſoils, however favourable for other vegetables, are not the beſt for producing timber; and it deſerves to be remarked, that ſo long as ground of this kind remains unplanted, little or no rich arable land ſhould be covered with trees.

But I wiſh it to be underſtood here, when ſpeaking of the great profits ariſing from plantations, that I always ſuppoſe proper management beſtowed on them. In the inſtances authenticated by theſe authors, which may be ſeen in different parts of the country, the ſoil was moſt commonly prepared, the plants always carefully inſerted, protected from cattle, cultivated, trained, and thinned; and hence the reſult:—but this is by no means the caſe with the plantations that are generally made, and, of courſe, they give but a faint idea of the profits ariſing from planting.

Beſides the intrinſic value of timber, there is another way in which wood is very profitable;

fitable; that is, by affording ſhelter to expoſed lands. In many places, ſtrips of wood alone, with little or no culture beſtowed on the ſoil, have rendered paſturage of triple its former value. In the north of Scotland, belts, and even ſingle rows of larches, have operated ſo rapidly and powerfully in this way, that their effects are hardly credible by any but thoſe who have been eye-witneſſes.

‘ Plantations of trees are ſingularly valu-
‘ able in another point of view, although
‘ the trees at the time may neither be fit for
‘ timber, undergrowth, or ſhelter, or any
‘ other uſe. It is univerſally known, that
‘ ſuch eſtates as have a portion of growing
‘ timber upon them, when brought to ſale,
‘ bring an extra price, according to the
‘ quantity and value of the timber, not only
‘ at the time of ſale, but counting on its
‘ value at a far diſtant period. Thus, ſup-
‘ poſing the half grown timber on an eſtate

‘ to be valued at ten thouſand pounds on the ‘ day of ſale, inſtances are not wanting where ‘ twenty, nay, twenty-five thouſand have ‘ been given over and above the value of the ‘ land. ’ *

The beauty of wood on individual eſtates is too obvious to require any illuſtration. Although every one cannot analyze its effects, all mankind can reliſh them. The noble grandeur and rich beauty of a hanging wood, in autumnal colouring, ſeen from below, cannot be unknown; and the fine effect of a dark green tree, or group of trees, backed by the ſplendour of a morning or the glow of an evening ſky, cannot be unfelt by any but the moſt inſenſible of mortals.

It is in the arrangement and management of trees and ſhrubs that landſcape gardening almoſt wholly conſiſts: all the other materials of landſcape are commonly beyond our controul.

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* Practical Planter, p. 341.

controul. Earth and rocks are in general too ponderous to contend with,—buildings are often too expenſive,—and water is only to be met with in certain ſituations and circumſtances; but we rarely find a ſpot where trees cannot be planted, and we can hardly conceive of one where they will not greatly add to the beauty and variety of natural ſcenery.

As wood is productive of beauty in landſcape, of profit to the planter, and of advantage to the farmer, it naturally follows, that he who directs the formation of plantations ſhould be well acquainted with trees in theſe three particulars. In this comprehenſive point of view, I have conſidered the ſubject of planting both in theory and practice; and the following pages contain ſome obſervations, which appear to me to be little attended to, and perhaps not well underſtood.

SECTION I.

ON THE OBJECT OF PLANTING.

THE different purpoſes for which Plantations are made, may be reduced to thoſe of *Ornament*, *Profit* or *Value*, *Shelter* or *Shade*; or, two or more of theſe purpoſes together.

Wherever *ornament* is the principal conſideration, there muſt be a *particular effect* which the artiſt intends to produce. This will either be

A beautiful variety,
A pictureſque variety, or
A degree of grandeur and *ſublimity*.

It will naturally occur to every one, that where a *beautiful variety* is to be produced, the moſt graceful and elegant forms, the moſt pleaſing colours, and the moſt fragrant ſmells, muſt be collected and arranged together according to the principles of beauty. *

Where a *picturesque variety* is to be produced, the forms collected ſhould be the moſt irregular that can be found; placed in a manner ſtill more irregular. The colours ſhould be forcible and ſtriking, and ſo contraſted, as to break in pieces uniformity, without deſtroying harmony; the ſmells alſo ſhould be of a correſponding nature.

It will be thought by ſome, that theſe are too nice diſtinctions; but thoſe who are converſant in trees and ſhrubs will allow, that a neat gravel walk, winding eaſily through a ſmooth turf, among varied groups of ſuch trees and ſhrubs as the willow, lime, acacia, variegated holly, arbutus, lilac, jaſmine, honeyſuckle, roſe, &c. will have a quite different effect, and be attended with a different ſmell, from thoſe of a path in a rugged dell, forcing itſelf through irregular groups and thickets of oak, elm, thorns, elder, dogwood, ſpurge, juniper, &c.; and, if we were to add appropriate plants and graſſes to each ſcene, their effects, particularly as to ſmells, would be much ſtronger.

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* In the limited ſenſe of the word, by Burke and Price.

Where a degree of *grandeur* or *ſublimity* is to be produced, the effect will often depend more upon the outline and extent of the plantation, than on the kind of trees planted. But oaks, cheſnuts and pines, have grand forms, and grave, ſolemn colours, of themſelves; and, when collected together, are better ſuited for this purpoſe than others of more light and airy ſhapes and gayer tints.

Theſe three effects may often be mixed together in different degrees; but the ſeparate expreſſions mentioned, are ſufficient to ſhew the neceſſity of attending to the qualities which produce theſe in trees and ſhrubs, and in their diſpoſition when collected together.

Where *profit* or *value* is the prime object in view, there will neceſſarily be a particular product to be grown, from which it is to be derived. This product may conſiſt of all, or any of the different parts of a tree; as the roots, trunk, branches, bark, &c. or of the eſſence of any of theſe parts, as the ſap, reſin, gums, tar, pitch, &c. Timber and bark, however, are the products moſt commonly raiſed; and theſe and their properties vary infinitely in different degrees. The timber of ſome is brittle, of others tough, of others hard, and of others ſoft:—and the bark is of different degrees of aſtringency, ſweetneſs, or acridity. Theſe qualities and parts of trees are all ſuited for different purpoſes in the arts; and thoſe of them which it is moſt deſireable to raiſe, muſt depend entirely upon the probable conſumption, the ſoil, ſituation, and other circumſtances. Wherever profit is the principal conſideration, the products moſt in demand ſhould be known; and the trees moſt productive of theſe, in the given ſoil and ſituation, muſt alone be planted. This may point out the neceſſity of attending to the natural ſoils and ſituations of trees and ſhrubs, the qualities of their products, their uſes in the arts, and their relative value.

Where *shelter* or *shade* is the principal conſideration, the qualities of each require to be inveſtigated, and thoſe forms uſed which are beſt adapted for that purpoſe.

The object of ſhelter is to produce heat; to protect cattle and paſture from the inclemency of the weather. Hence, the trees uſed for this purpoſe ſhould be clothed with branches and foliage from the ground upwards. The foliage ſhould be perpetual; and, if poſſible, a non-conductor of heat, ſuch as that of the reſinous tribe of evergreens. This may be thought too nice a diſtinction; but any perſon would be ſenſible of the difference, if in a windy day he were to ſtand alternately under the ſhelter of a *holly* and a *spruce* of equal thickneſs.

The object of *shade* is to produce cold; that men or cattle may enjoy the cool refreſhing breeze during the mid-day ſun. For this purpoſe, it is eſſentially neceſſary that the ſtems of the trees be free from branches to a conſiderable height, in order to promote the free circulation of the air. It is true, moſt trees may be trained in this form; but the operation would hurt ſome kinds, while others again are greatly improved by pruning. The ſhade of ſome trees is pernicious, and ſhould be guarded againſt; others are ſo thin of boughs and leaves, that the rays of the ſun will pierce through between them; and theſe alſo muſt be rejected. This may ſhew the neceſſity of attending to the nature and kinds of trees that are planted for either of theſe purpoſes.

It is the intention of this Section to ſhew how eſſentially neceſſary it is for the planter to be intimately acquainted with the characteriſtic diſtinctions, and particular properties of trees and ſhrubs. He ſhould not reſt ſatisfied with a general knowledge; he ſhould have a clear and diſtinct picture of every individual ſpecies in his mind; that, whenever a tree is wanted, that kind may inſtantly preſent itſelf which is beſt fitted for his purpoſe. . . . . .

SECTION II.

OF THE CHARACTERISTIC DISTINCTIONS AND PARTICULAR PROPERTIES OF TREES AND SHRUBS.

IT is almoſt unneceſſary to mention, that a botanical knowledge of every tree and ſhrub is eſſentially neceſſary for the planter; but it is not by minute botanical diſtinctions that theſe muſt be arranged in artificial ſcenery. The general magnitude, form, and colour, are what more immediately ſtrike the eye; and the effect of a plantation conſiſts in the agreement and relation of the trees in theſe characteriſtics. But in plantations, where profit is the ſole object, the principal thing to be attended to is their particular properties, by which they are adapted for particular ſoils, ſituations, and uſes. Theſe are ſo intimately connected with their characteriſtic diſtinctions, that in proſecuting this ſubject with a view both to ornament and utility, it ſeems neceſſary to treat of them together in the following order:

1. Magnitude,
2. Form.
3. Texture.
4. Colour.
5. Mode of Growth.
6. Smells.
7. Bark.
8. Buds.
9. Leaves.
10. Flowers.
11. Fruit.
12. Roots.
13. Propagation.
14. Soils.

15. Situation.
16. Culture.
17. Pruning.
18. Tranſplanting.
19. Products.
20. Uſes.
21. Relative Value.
22. Natural Character.

1. With reſpect to *magnitude*, trees and ſhrubs are either *very tall*, as the horſe-cheſnut and the larch, the cornelian cherry, and the ſnowdrop tree; or *very low*, as the mountain aſh and hemlock fir, the Scotch roſe and the butchers broom. Some trees are *very broad*, in proportion to their height, as the oak and the Spaniſh cheſnut; others are *very narrow*, as the larch and the ſpruce fir. There is a *medium* betwixt all theſe extremes, as the aſh-leaved mapple and the evergreen oak, the Virginian raſpberry, and the Guelder roſe.

2. With reſpect to *form*, the different varieties may be included under the following heads.—*Apparently solid*, being thick with branches and foliage, as the horſe-cheſnut and the Engliſh elm, the lilac and the ſyringo;—*light and airy*, thin of boughs and leaves, as the aſh and the hoary poplar, the bird cherry and the Canadian meſpilus. There is a *mediate degree* betwixt theſe two extremes in the broad-leaved *euonymus* and the aſh-leaved mapple.

They may next be divided into *those, whose branches begin from the ground*, as the fir tribe and moſt ſhrubs; or *those which shoot up into a stem before their branches begin*, as the mountain aſh and the *althæa frutex*.

Of thoſe whoſe branches begin from the ground, ſome riſe in *an elegant cone*, as the larch and the holly; others in a *cone whose base is very broad*, as the cedar; or whoſe *base is very small*, as the upright cypreſs.

Some *swell out in the middle of their growth*,

growth, and diminiſh at both ends, as the Weymouth pine; and ſome are *broadeſt at the top*, as the raſpberry and the Alpine honeyſuckle; ſome are *irregular and buſhy* throughout, as the evergreen oak, and the ſnowball tree.

Of thoſe which ſhoot up into a ſtem before their branches begin, ſome are *slender cones*, as the deciduous cypreſs; others are *broad cones*, as the balſam poplar. Some aſſume *a globular form*, as the mountain aſh; and many are *irregular throughout*, as the Scotch elm and the acacia.

3. With regard to *texture*, ſome trees and ſhrubs have a *soft, smooth appearance*, as the lime and the ſcorpion ſenna; others have a *rough, firm-like appearance*, as the evergreen oak, and the holly. Some have a *smooth, silky-like appearance*, as the tamariſk; others have a *downy, woolly-like appearance*, as the hoary poplar. Some appear *totally covered with thorns*, as the furze and the hedgehog

holly; others appear wholly compoſed of *thread-like ſhoots*, as the Portugal broom.

4. *Colour* in trees or ſhrubs is either *accidental* or *permanent.* *Permanent* colours include all the different ſhades of *green* in the ſummer months; *accidental* colours the tints of *red and yellow* that are peculiar to autumn and ſpring.

Some permanent colours are of a *dark green*, as thoſe of the horſe-cheſnut and the yew; ſome are of a *light green*, as thoſe of the aſh and the common laurel; ſome are of a *blue green*, as thoſe of the Scotch fir and the bladder ſenna. Some trees are of a *green*, *tinged with brown*, as the Virginian cedar; others of a *green*, *tinged with white*, as the abele and the Lapland willow. Some greens are *tinged with yellow*, as the aſh-leaved mapple and the Chineſe arbor vitæ; ſome are *tinged with red*, as the ſcarlet mapple; others are *tinged with purple*, as the purple beech. Some greens are ſpotted with *white*, *yellow*, *and red*, as the variegated holly, privet, ſycamore, box, and many others.

Accidental colours are infinite in number, and each kind is liable to much variation.

In autumn, however, it will generally be found that the wild-cherry aſſumes a *bright red*, the birch a *deep red*, the beech a *browniſh red*, the ſcarlet oak a *deep scarlet*, the hornbeam a *russet colour*, the ſugar-mapple a *rich yellow*, the oak a *reddish yellow*, the lime and aſh a *straw colour*, the poplar *black*, the ſycamore *brown*, &c.

5. The *modes of growth* are very different in trees and ſhrubs. Some ſend out their branches *horizontally*, as the oak; in others, they *tend upwards*, as in the Huntingdon willow; in others, they *fall*, as in the lime, and the acacia. In ſome, they *incline obliquely*, as in the Scotch fir; in ſome, they *recline, and then riſe up*, as in the larch;

in others, they *hang directly down*, as in the weeping aſh and weeping willow. Some ſhrubs *creep along the ground*, as the periwinkle; others *claſp themſelves to trees*, as the paſſion-flower; others *fix themſelves to buildings*, as the ivy.

Some trees have one principal ſtem, from which all the branches proceed *as rays from a centre*, as in the fir tribe; in others, the trunk divides itſelf into arms, which ſend out branches *irregularly*, as the oak, &c. Some ſhrubs have only a *ſingle ſtem*, as the althæa; others conſtantly ſpread along the ground, ſending up *more*, as the hypericum.

6. With reſpect to *smells*, ſome trees and ſhrubs have ſcarcely any, as the evergreen oak and the platanus; others have a moſt *grateful fragrance*, as the birch and the ſweetbriar. Some have a *luſcious* ſmell, as the mezerion; others a *diſagreeable* ſmell, as the elder; and the ſmell of ſome is *deleterious*, as that of the walnut and the arte-

miſia. The fragrance of ſome is greateſt when the plant is in bloſſom, as the hawthorn; in ſome, it is confined entirely to the bloſſom, as the lilac; in others, it is equally diffuſed throughout the whole plant, as in the ſweet bay, and ſeveral others.

Theſe are the general characteriſtics of trees and ſhrubs; but there are many other peculiarities which preſent themſelves, upon a more minute examination, which, where ornament is attended to, deſerve alſo the attention of the planter. Some of theſe I ſhall notice in the *bark*, *buds*, *leaves*, *flowers and fruit.*

7. With reſpect to the *bark* of trees and ſhrubs, in ſome it is of a *red colour*, as in the dogwood; in ſome *white*, as the birch; in others *black*, as the oak; in ſome *brown*, as the Guelder roſe; in others *green*, as the holly. The texture of the bark of ſome trees is *firm*, as the oak; of others *ſpungy*,

as the cork tree. The bark of ſome is *very thin*, as the beech; of others *very thick*, as the Scotch fir. Of ſome it is *brittle*, as the hornbeam; of others *glutinous*, as the holly; of others *thready*, as the lime and the elm.

The *duration of bark* varies. Some trees throw off annually their outer coat, as the arbutus and the birch; but moſt trees conſtantly retain it.

The *properties* of ſome barks are *aſtringent*, as thoſe of the oak and the bramble; of others *ſweet*, as of the lime; of others *bitter*, as of the abele; of others *reſinous*, as of moſt of the fir tribe.

8. With reſpect to *buds*, ſome trees have *no buds* at all, as the pine tribe, and moſt evergreens; in others they are *very large*, as the horſe-cheſnut; in others *very small*, as in the willow. In ſome they are covered with a coat of *glutinous matter*, as thoſe of the horſe-cheſnut; in others with a *dry tegument*, as thoſe of the beech. Some buds

are of a *red colour*, as thoſe of the lime; others are *yellow*, as thoſe of the willow; others *black*, as thoſe of the aſh; *brown*, as in the beech; or *red and green*, as thoſe of the common ſycamore.

9. There is an almoſt infinite variety in the *leaves* of trees and ſhrubs. Some are *very broad*, as the common laurel; others *very narrow*, as the larch. There is a *medium* betwixt theſe two extremes in the willow and the almond. Some leaves are *entire*, as the bay; others *serrated*, as the cherry; *pinnatifid*, as the acacia, &c. Some leaves are *covered with down*, as the ſea buckthorn; others *with wool*, as the hoary poplar; others with *prickles*, as the holly; others with a *glutinous ſubſtance*, as the gum ciſtus, &c.

Leaves are of all the different ſhades of green in the ſummer months; and of all the different tints of red and yellow in autumn and ſpring.

Some trees retain their leaves and colour throughout the whole year, as the pine tribe; others loſe their green colour in autumn, yet retain their leaves all winter, as the beech and the hornbeam in ſome circumſtances. The elm, the aſh, and moſt other trees, drop their leaves in autumn, and are naked all winter.

Leaves have, in general, the ſame properties as the bark, only in a fainter degree. Theſe are of conſiderable importance. Thoſe of the alder are refuſed by cattle; thoſe of the elm are greedily devoured*; thoſe of the fir are obnoxious to many inſects which infeſt hothouſes, &c.

10. The *flowers* of trees vary almoſt as much as the leaves. Thoſe of ſome are *large and ſhewy*, as the roſe and the honeyſuckle; in others they are *small and obscure*,

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* The Romans fed their cattle with the leaves of this tree.

ſcure, as in the alaternus. The flowers of ſome *cover the whole plant*, and ſoon fade, as thoſe of the hawthorn; in others, they are *thinly diſtributed*, and continue a long time, as thoſe of the paſſion-flower. Some come into bloſſom *very early*, as thoſe of the mezerion; others *very late*, as thoſe of the ſweet cheſnut, and the *althæa frutex*. Some trees and ſhrubs are *done with flowering before their leaves expand*, as the almond; the bloſſom of others makes its appearance only *when the leaves fall off*, as that of the hazel.

11. The *fruits* or *seeds* of trees vary conſiderably. Some are of a *bright colour* and *shewy appearance*, as the cluſtered berries of the mountain aſh; in others, the ſeed is *very obscure*, as in the willow. Upon ſome trees the ſeeds remain *two or more years*, as the cones on the fir tribe; in others but *a few weeks*, as the capſules of the elm. Some fruits or ſeeds are *used as food*,

as the apple and the walnut; others for *fattening the inferior animals*, as the acorn and the beech-maſt; ſome again *are poisonous*, as the berries of the nightſhade, and thoſe of the mezerion.

The obſervations which follow, along with *characteristic distinctions*, compriſe what may be called *particular properties* of trees.

12. The *roots* of trees are as much varied below ground, as the ſtem and branches are above the ſurface. Some ſpread themſelves *horizontally*, as thoſe of the pine and the fir tribe; others ſend down *perpendicular* roots to a great depth, as thoſe of the oak and the cheſnut. There is a *medium* betwixt theſe two extremes, in thoſe of the lime and the beech.

13. The modes of propagating trees and ſhrubs are various. Some are raiſed from *seeds*, as moſt foreſt trees, ſuch as the oak,

aſh, elm, larch, &c.; others from *layers*, as the lime, platanus, roſe, and moſt ſhrubs; others from *cuttings*, as the poplar, willow, honeyſuckle, &c.; others from *suckers*, as the abele, gale ſpirea, &c. Others are propagated by *ingrafting*, as the weeping aſh; others by *inoculation*, as the double-bloſſomed almond, and the weeping cherry. And ſome kinds are, or may be propagated from the *roots*, as the thorn, mezerion, &c.

14. With reſpect to the *natural soils* of trees: ſome love a *deep*, *strong soil*, as the oak; ſome a *dry*, *gravelly soil*, as the beech; ſome a *deep*, *moist soil*, as the poplar; others a *peat-earth soil*, as the erica, &c.; others, again, love a *wet soil*, as the alder. Some trees will grow in almoſt *any soil*, as the Scotch fir; others will ſcarcely grow in any but their *natural soil*, as the rhododendron and the andromeda. Some hardly *require any soil*, as the ivy; others are *parasites*, as the miſletoe.

15. The natural *situations* that trees will grow in, are various. Some will endure expoſure of almoſt *every kind*, except a ſtrong ſea breeze, as the larch, Scotch fir, and mountain aſh; ſome endure the *sea breeze* much better than others, as the ſycamore, aſh, and ſervice; ſome will not proſper except in a a low, *sheltered situation*, as the black ſpruce, and moſt American plants; ſome will grow under the *drip and shade* of others, as the dogwood and box; others would die in that ſituation, as the larch and the willow.

16. Trees and ſhrubs, eſpecially when young, require not only a ſoil and ſituation, but a *culture*, ſuited to their reſpective natures. Some require the earth to be *frequently stirred* about their roots, as the lime and the lilac; others will make equal progreſs according to their natures, if *the surface is kept free of other vegetables*, as the oak and the cheſnut; others thrive beſt

when the *surface is covered* with moſſes, as the rhododendron and the erica.

17. With reſpect to *pruning*, there are ſome trees that will *not bear the knife*, as the cherry: the wood of others is *much hurt by it*, as the pine and fir tribe. Some, again, will *bear it to any degree*, as the thorn and the crab-apple.

Theſe peculiarities apply to trees of ſome height. Moſt trees, when very young, will bear pruning; and many require it, to train them to ſingle ſtems. The *silver fir*, when in the nurſery, requires its ſide ſhoots to be ſhortened; and young oaks, ſome years after they are finally tranſplanted, ſhould be cut over by the ſurface.

18. Moſt trees require to be *transplanted* in the nurſery-ground the firſt or ſecond year from the ſeed; and re-tranſplanted from the nurſery into plantations, when under four

feet high. Some are *little hurt* by this removal, as the elm; *others sometimes die* after it, as the ſpruce and the Weymouth pine. Some trees *will not remove* after they are eight or ten feet high, as the pine and fir tribe; others *will remove* at, and conſiderably above double that age, as the lime, the elm, the ſycamore, and many other deciduous trees; but a year or two previous to removal, their roots muſt be cut, and their tops pruned, &c.; a moſt important precaution, that ſhould never be neglected in removing trees above ten feet high.

19. Though ſhrubs are commonly planted for ornament, and trees to produce timber; yet there are other *products* for which they are occaſionally planted. The *leaves* of ſome kinds are uſed, as thoſe of the mulberry; the *bark* of others, as that of the oak and the holly; the *flowers* of others, as thoſe of the roſe and the ſyringo; the *seeds or*

fruits of others, as thoſe of the beech and the apple, &c.

20. The different products of trees are *used* by various artiſts and profeſſions.

The *chemiſt* uſes the bark of ſome for birdlime, as that of the holly; the *manufacturer* the bark of others for matts, as that of the lime and the elm.

The *silk growers* uſe the leaves of ſome, as thoſe of the mulberry.

The *apothecary* uſes the bloſſoms of ſome, as thoſe of the roſe; the *confectioner* the bloſſoms of others, as thoſe of the ſyringo.

Bread is made of ſome ſeeds, as thoſe of the beech. *All mankind* uſe the fruits of others, as thoſe of the pear, plum, &c.

Shipbuilders uſe ſome kinds of wood in particular, as the oak. The larch might alſo be trained for this purpoſe, by bending down the ſtem when twenty feet high, and fixing it in a certain poſition. (*See Plate* 1.)

House-carpenters uſe the fir and pine; *mill-*

mill-wrights the crabtree; *plough-wrights* the aſh; *cabinet-makers* the beech, elm, walnut, cherry, plum, box, holly, yew. The *carver* uſes the lime; the *turner* the ſycamore; the *mathematical inſtrument maker* the box and holly; the *laſt* and *heelmaker* the alder and birch.

Iron-founders uſe charcoal of any kind.

Gunpowder-makers uſe that of the dogwood, ſallow, alder, and hazel.

Turpentine and its *oil* are extracted from the larch and the ſilver fir. *Reſin*, *tar*, *pitch*, and *lamp-black*, from the ſpruce and the pine tribe. *Potaſh* may be extracted from any wood, but principally from the beech, aſh, and elm.

Wine may be made of the ſap of many trees, as the birch; *ſugar* of the ſap of others, as the ſugar-maple, &c.

21. The *relative value* of timber depends almoſt entirely upon local circumſtances.

Oak and elm, proper for ſhip-building, growing in the neighbourhood of a dry-dock, will be more valuable than if it were a hundred miles up the country.

Undergrowth of dogwood, ſallow, and alder, in the neighbourhood of a gunpowder manufactory, is of great value: but, at a diſtance, it can be uſed only as fuel, &c.

There are, however, ſome kinds of wood that, from their univerſal application, are valuable every where; ſuch as the *oak*, the *elm*, the *aſh*, the *beech*, and to which may be added, as the moſt valuable, the *larch*.

There are other kinds which, from their ſcarcity, are valuable every where, as the *box*, the *holly*, and the *yew*. The lighter products, ſuch as *birdlime*, *potaſh*, *turpentine*, *pitch*, &c. may be reckoned equally valuable every where.

The tree that will be moſt valuable in a given ſituation, may not grow in a given ſoil. In this caſe, the tree that will come to the greateſt perfection in that ſoil, will generally be found the moſt valuable.

A wood, not valuable from local circumſtances, may, by manufacturing it on the ſpot, in order to render carriage leſs expenſive, or by ſome ſuch method, be rendered much more valuable.

From the general introduction of good roads and canals, and the ſpirit for increaſing theſe, there can hardly be a ſituation, in which plantations will not be valuable for timber; and it is impoſſible to conceive one where the other products will not be of great value.

'Every perſon who can meaſure timber
'thinks himſelf qualified to value ſtanding
'trees; but ſuch men are often deceived in
'their eſtimates. It is the perfect know-
'ledge of the application of the different
'ſhaped trees that enables a man to be cor-
'rect in his valuation. A foot of wood
'may

‘ may be of little value to one trade, but of
‘ great value to another. This is the grand
‘ ſecret which enriches the purchaſers of
‘ ſtanding timber.’ *

22. When a tree or ſhrub is poſſeſſed of a number of qualities that produce ſimilar emotions, it is ſaid to have *expreſſion* or *character*.

Thus, the *cypreſs* is of a uniform, unchangeable ſhape, and conſtantly of a dark green colour. It has a ſtill, ſolemn appearance; and hence it has obtained the character of melancholy.

There is a ſimilar train of emotions, but in a fainter degree, produced in the mind by the falling branches, drooping ſpray, and yellow colour of the *weeping willow*. It ſuits with ſcenes of ſolitude, and leads to meditation.

There is a degree of cheerfulneſs in the light, airy form of the *aſh*, and the bright white of the variegated *holly*; eaſe and graceſulneſs in the feſtoons of *virgins' bower*; delicacy in the *myrtle*; and a peculiar elegance in the ſweep of the ſtem, and curve of the branches of the *larch*. The *oak* and the *cheſnut* poſſeſs forms which have long been aſſociated with *grandeur* and *ſublimity*.

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* Hunter's Evelyn's Sylva, p. 112.

Theſe and many other trees, are remarkably expreſſive of certain characters. This ariſes partly from the nature of the trees themſelves, and partly from aſſociation of ideas. The *cypreſs* has been planted on burial places; the *weeping willow* to ſhade urns; the Romans crowned their warriors with *laurels*; and the *cheſnut* was introduced into the landſcapes of Salvator Roſa.

SECTION III.

OF THE ARRANGEMENT OF TREES AND SHRUBS.

ENOUGH has been done in the preceding ſection to ſhew that there is an inexhauſtible fund of variety in trees and ſhrubs: I ſhall now make ſome obſervations reſpecting their arrangement in artificial ſcenery. And it may be premiſed here, that thoſe who underſtand the general principles of painting, will eaſily diſcern and follow the proper mode; but, on the contrary, thoſe who are ignorant of theſe principles, although

though they may know every tree and ſhrub, will ever wander in darkneſs, and produce confuſion and incongruity.

All ornamental plantations may be divided into two kinds; thoſe where *grandeur* is the effect to be produced, and thoſe where *variety* is the principal object. As grandeur depends more upon the whole, than upon the parts, it may be produced where only one kind of tree is uſed; but as variety depends upon the parts alone, a number of different kinds is neceſſary. This has given riſe to a moſt erroneous opinion and pernicious practice among landſcape gardeners and planters. They imagine that variety is produced by mixture; and their rule is, to 'mix as many kinds together as they poſſibly can, and never to let two trees of the 'ſame ſpecies be ſeen at once.' This is their receipt for variety in plantations; and they never fail to follow it in every arrangement of vegetables, from the parterre to the foreſt. But does it produce variety? No. On the contrary, it produces the moſt diſtracting incongruity. The eye, in examining the parts, finds no connexion—no harmony—no relief—no repoſe of effect—no difference of compoſition, nor change of character: or, if from a diſtance we look upon the whole, it is in the other extreme, more dull and monotonous than if only one ſpecies of tree had been uſed.

This mixture is evidently made from ignorance of what conſtitutes variety; for it does not, as they imagine, conſiſt in the diverſity of ſeparate parts, but 'in the di-'verſity of their effects when combined to-'gether; in a difference of compoſition and 'character:'* Such a variety relieves the eye, and ſatisfies the mind, without fatiguing either.

In place, then, of diſtinct kinds, trees or ſhrubs, differing in any one of the general characteriſtics, are ſufficiently diſtinguiſhed for the purpoſe of variety. If they differ in two or more of them, they become contraſts; 'if in all, they are oppoſites, and will never harmonize.' But there is ſuch an immenſe ſtore in nature, that thoſe apparently the moſt different may be brought together, with good effect, in the ſame plantation.

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* Price.

The upright, ſpiry *form* of the larch, mixes very ill with the round head of the oak. But there are trees of intermediate forms, which, placed in the interval between them, will make the connexion complete, and the gradation eaſy and natural; and, by this means, an endleſs ſource of variety may be had from the forms and modes of growth alone.

There is another ſource of variety which ariſes from the manner in which trees are diſpoſed, more than from the number of diſtinct ſpecies.

‘ I have often obſerved in foreſts, (thoſe ‘ great ſtorehouſes of picturesque diſpoſitions ‘ of trees) that merely from oak, beech, ‘ thorns, and hollies, aroſe ſo many combinations, ſuch different effects from thoſe ‘ which are gained by ever ſo great a diverſity of trees lumped together, that one ‘ could hardly wiſh for more variety. It ‘ put me in mind of what is mentioned of ‘ the more ancient Greek painters; that ‘ with only four colours they did what, in ‘ the more degenerate days of the art, could ‘ not be performed with all the aid of ‘ chemiſtry.

‘ The true end of variety is to relieve ‘ the eye, not to perplex it: It does not ‘ conſiſt in the diverſity of ſeparate objects, ‘ but in the diverſity of their effects when ‘ combined together; in diverſity of compoſition, and of character. Many think, ‘ however, they have obtained that grand ‘ object, when they have exhibited, in one

'body, all the hard names of the Linnæan
'ſyſtem:* But when as great a diverſity
'of plants as can well be got together is
'exhibited in every ſhrubbery, or in every
'plantation, the reſult is a ſameneſs of a
'different kind, but not leſs truly a ſame-
'neſs than would ariſe from there being
'no diverſity at all; for there is no having
'variety

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* 'In a botanical light, ſuch a collection is ex-
'tremely curious and entertaining; but it is about
'as good a ſpecimen of variety in landſcape, as a line
'of Lilly's Grammar would be of variety in poetry:
'*Et poſtis, vectis, vermis, ſocietur et axis.*
'A collection of hardy exotics may alſo be con-
'ſidered as a very valuable part of the improver's
'palette, and may ſuggeſt many new and harmoni-
'ous combinations of colours; but then he muſt not
'call the palette a picture.'

When a full collection of vegetables are to be planted about a place, the beſt way is to conſider the whole as a botanic ground, and arrange them according to the natural claſſes of Linnæus or Juſſieu: This would at once be the moſt pleaſing to the botaniſt, and the moſt agreeable to the principles of painting.

‘ variety of character without a certain diſ‘ tinctiveneſs, without certain marked fea‘ tures on which the eye can dwell.

‘ In foreſts and woody commons, we ‘ ſometimes come from a part where hollies ‘ had chiefly prevailed, to another where ‘ junipers or yews are the principal ever‘ greens; and where perhaps there is the ‘ ſame ſort of change in the deciduous trees ‘ and underwood. This ſtrikes us with a ‘ new impreſſion; but, mix them equally ‘ together in all parts, and diverſity becomes ‘ a ſource of monotony.’ *

Another ſource of variety, which is independent of the modes of growth or the manner of diſpoſition, is *colour*. Hence, to aſſiſt in the arrangement of a numerous collection of trees and ſhrubs, a knowledge of the harmony of tints is eſſentially neceſſary for the planter. The ſubject, however, more properly belongs to painting; but a

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* Price's Eſſays, vol. I. p. 117.

few remarks here may tend to ſhew its importance.

It may be thought by ſome, that the different tints of green in trees are too minute diſtinctions to be attended to; but reflection and experience ſhew that they are of material conſequence in ſcenery. Imagine two woods of equal and conſiderable extent, —the one compoſed of the yellow green of the weeping willow, the other of the dark green of the oak: how different muſt be the impreſſions received from each, though the general form and compoſition of both, at a diſtance, would appear the ſame! It is abundantly evident, that the effect of the different greens muſt be much more conſpicuous in ſcenes intended to be more minutely examined by the eye:—how different the green of even the gooſeberry and currant trees when oppoſed to each other!

The tints of trees may be conſidered with reſpect to their harmony with one another—with external ſcenery—their gradation—and their particular effects.

The harmony of tints, in general, is derived from certain laws in optics, by which certain colours, as *red* and *green*, *yellow* and *purple*, *blue* and *orange*, agree with one another reſpectively; and certain other colours, as *red* and *orange*, *yellow* and *green*, *blue* and *purple*, diſagree with each other reſpectively: and again, certain colours, as *green*, *purple*, and *orange*, when mixed together, deſtroy each other.

Theſe harmonies, diſcords, and privations, will remain true, although the colours ſhould not be bright of themſelves. The ſlighteſt tinge will have the effect. When weak colours that agree are placed adjoining, they ſupport and give ſpirit to each other. A hawthorn hedge, among the green of paſture fields, has the ſame dull, green appearance; but when oppoſed to the brown of a ploughed field, it appears with peculiar ſpirit and force. Again, the ploughed field, were it not contraſted with the hedge or ſome ſuch colour, would appear dark and colourleſs; oppoſed to the hedge, it appears of a rich brown.—A Huntingdon willow, obſerved alone, appears green, like any other tree; but, contraſted with an oak or a cheſnut, it is evidently white; and the oak again, by the contraſt, appears much darker than before.

If wood was arranged agreeably to theſe principles, the colours would at all times appear ſtriking and forcible; but from the oppoſite conduct, that of mixing all colours together, the colours themſelves are annihilated, and their ſeparate effects deſtroyed. It is in conſequence of this, that many ſay, *trees have no colour but green, except in autumn*; and that attention to theſe principles in their arrangement is frivolous. But nothing can ſhew greater ignorance of nature. Green is indeed the predominant colour of trees; but it is only in one or two of the ſummer months that it nearly abſorbs every other colour. All trees have their peculiar autumn and ſpring tints, which in midſummer are only weakened, not deſtroyed: And, whether it be not of greater importance to attend to the harmony of theſe tints, than to neglect it altogether, becauſe the labour would be in ſome degree loſt during a month or ſix weeks in ſummer, I leave every man of taſte or ſenſe to judge.

It is abundantly plain, that the *harmony of wood with landſcape* muſt depend upon the general principles that have been already mentioned. One principle of harmony is, that the general appearance of the wood planted about a place ſhould correſpond with the general appearance of the wood in the ſurrounding country: if otherwiſe, the eſtate ſo planted will appear a formal ſpot in the general view.

tion to light green, or the contrary; and if, in addition to this, the line of the plantation be broken, the fallacy can ſeldom be detected.

Though the harmony of tints produces a pleaſing ſcene, their diſagreements, on the other hand, may produce a ſtriking effect. An outline, which cannot be varied in form, may be broken by the oppoſition of its tints, or by maſſes of dark and light greens. Two or three trees together, that form a ſtriking contraſt with all around, may attract the eye, and fix it ſo as either to admire ſome object, as a building; or prevent it from viewing ſomething diſagreeable, or leſs noble in the ſcene. Trees of a reddiſh tint, or evergreens, have the power of attracting the eye in an aſtoniſhing degree: in many places, where the former have been planted at random among other trees, they diſtract the whole ſcenery in the autumnal months.

Theſe hints on the different tints of trees are of great importance in ornamental ſcenery: I ſhall now make ſome obſervations on the mode of arrangement proper for uſeful plantations.

As every tree has a certain ſoil and ſituation, in which it will proſper better than in any other, (that is, produce the greateſt quantity and beſt quality of timber;) and as this tree will generally pay better than more valuable kinds that would not thrive there; it follows, that, in the formation of uſeful plantations, one great object muſt be, to accommodate the trees to theſe circumſtances. But as the nature of ſoils and ſituations is various, this would naturally lead to a correſponding variation of the ſpecies of tree alſo; and this variation at once produces ornament and utility. Were this practice adopted in the formation of uſeful plantations, they would be made at a much leſs expence, and be much more profitable and ornamental than the common abſurd mode of mixture; than which, none more deſtructive of theſe properties could poſſibly be imagined.

But the mode of arrangement, which I follow, is univerſally prevalent in the ſcenery of nature. To be convinced of this, we have only to obſerve the conſtituent parts of a natural foreſt. In one place, we find the oak as the principal tree; the hazel the principal undergrowth; the cowſlip the principal plant; the *poa nemoralis* the principal graſs; and the *hypnum* the principal moſs. Farther on, a few beeches mingle themſelves with the oaks; a little farther ſtill, beech becomes the principal tree. The undergrowths changing in the ſame way, we there find the thorn, the violet, the *poa trivialis*, and the *bryum*. The ground becomes moiſt, and gradually the birch appears; it becomes more ſo,—and, as the birch retires, the alder ſucceeds—each with appropriate undergrowth, or ever-varying glades of paſture; which, with the grouping, &c. is foreign to my purpoſe here; but they are moſt valuable inſtructions for the landſcape gardener.* The arrangement goes on thus throughout the whole foreſt; and if the ſoil were examined, it would be found to vary correſpondently with the trees. Where the oak abounds, it will be found deep and good; dry where the beech proſpers, and moiſt where the birch prevails.

Few have an adequate idea of the effects that might be produced by adopting this mode of arranging vegetables in artificial ſcenery, and particularly in woods, ſhrubberies, and all ornamental plantations. None but thoſe who unite a knowledge of botany and painting, can conceive the variety and perpetual intereſt that would thus be created about a place even of the ſmalleſt extent. At preſent, all places, and all the plantations about a place, have the ſame general appearance; becauſe compoſed of the ſame kind of mixture. A ſhrubbery in one eſtate, is preciſely the ſame with one at a hundred miles diſtance; and a few ſquare yards of either is a pattern of all the ſhrubberies in Britain—nay, I might ſay, on earth. But, were nature followed in this reſpect, the variety would be endleſs. Nothing could then be more intereſting than to walk or ride through a place, thus laid out; to look at the trees, ſhrubs, plants, and even the graſſes and ferns; the infinite diverſity of the ſhapes, colouring, and compoſition of the trees and ſhrubs; and the ever-varying openings and intricate receſſes between them—again varied with groups and tufts of flowering plants and ferns, ſpreading themſelves among the graſs, in every direction, like natives;—and all this independently of every other object,—ſuch as buildings, rocks, water, animals, diſtant proſpect, and even ~~variety in the grounds.~~ So that, by this mode of planting, a place, naturally the moſt dull and inſipid, may be made infinitely varied and intereſting. And I repeat, that this mode of arrangement is not more beautiful in ſhrubberies, flower-gardens, and green-houſes, than it is profitable in extenſive plantations.

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* See Gilpin's Foreſt Scenery.—Walks in a Foreſt, &c.

SECTION IV.

OF THE DISPOSITION OF WOOD, WITH RESPECT TO THE SURFACE OF THE GROUNDS ABOUT A PLACE, AND THE GENERAL SURFACE OF THE COUNTRY.

THE form of ſurface moſt deſireable to be planted with wood, in the grounds immediately adjoining a gentleman's ſeat, muſt be determined by the general character which the place is to aſſume, and by the particular expreſſions of the ſeveral parts.

In a place where the grounds are of an even, or level ſurface, there can be nothing to interfere with this rule; but when the ſurface is varied with ſwells, hollows, and abrupt ſpots, the great art is to combine the natural character of the place with the character to be created; and if both theſe are underſtood by the deſigner, an effect may be produced, much ſuperior to the other.

Independently of artificial characters, however, nature always points out riſing grounds for plantations. Wood placed on knolls or ſwells heightens their effect, and gives ſpirit, force and intricacy to a ſcene, otherwiſe tame and monotonous. On the contrary, wood placed in the hollows only, or in the hollows and eminences indiſcriminately, deſtroys all the expreſſion or natural features of the grounds, and often produces deformities. Nothing is more noble than a ſteep hill clothed with wood: but, imagine this hill perfectly bare, while the ſurrounding country is wooded, and it becomes a deformity in the general view.

In almoſt every ſituation, it is counteracting nature to plant the hollows, and leave bare the eminences. Even in pleaſure grounds or parks, a group of ſhrubs, or a few trees placed upon a gentle riſe, ſet off the ſcene, as it were, at once, or at leaſt after two or three years growth: but, plant them only in the low places, and they will remain, until full grown, before they have much effect; and at that time, though the place may have the appearance of wood at a diſtance, yet, when it is examined particularly, the features of the ground are totally deſtroyed. There are many places that have a ſufficient quantity of old wood, which, if it had been planted with a proper regard to the natural variety of the grounds, would have made theſe places as ſuperior to their preſent ſtate, as that is ſuperior to a place totally deſtitute of trees.

It is not intended, however, that no low place ſhould be planted, or that trees ſhould be placed formally on the ſummit of every eminence; on the contrary, dells, dingles, and ſuch romantic places, ſhould be ſhaded with wood; and not a group not a ſingle tree ſhould exiſt but what appears connected with other trees as well as with the grounds.

Taking the country in a general point of view, the hills ſhould be wooded; the riſing grounds betwixt the hills and the vallies diverſified with gentlemens' ſeats, paſture lands, and ſome corn fields; and the vallies themſelves kept in a ſtate of almoſt perpetual aration.

Moſt of theſe vallies, to prevent the ſtagnation of the air, and to ſuit the particular mode of farming for which they are adapted, ſhould be free from plantations, and ſometimes even from hedges. They ſhould preſent, in autumn, broad flat ſhades of rich yellows, interſperſed with farm-ſteadings, and relieved by roads, canals, and rivers, ſuch as the Carſe of Gowrie and Strathearn appear from the ſurrounding mountains.

Upon the riſing grounds and the ſides of hills, the caſtles, manſions, towns and villages, with every variety of paſture and wood, interſperſed with ſtreaks of corn fields, would form a contraſt with this fore ground; and the mountains, almoſt wholly clothed with wood, would form a grand back ground to this rich and noble ſcene.

There is nothing of ſo great importance as the ſituation of wood, whether we look to the general appearance of a country, and the improvement of its climate, or to the beauty and value of individual eſtates. All other operations that can be made about a place are, comparatively, of little importance. It is the wood, like the ſhades in a picture, that gives the effect; and as it is by the ſituation and relative connexion of theſe ſhades, that an expreſſive or unmeaning picture is produced by the painter; ſo, by the ſite and connexion of plantations, a place is either deformed or beautified by the planter. Even ſmall groups and detached-trees, like the laſt touches in a picture, are of the utmoſt conſequence; and every painter knows, that, when theſe are laid on by an unſkilful hand, they never fail to ſpoil the whole piece.

It is lamentable to ſee the plantations which are daily making at a conſiderable expence, without any regard to this principle. In the dull levels of England, it may be thought of leſs conſequence; but in Scotland and Wales, where the grounds are beautifully varied by nature, it is of the utmoſt importance. In leſs than half a century, wood will completely change the appearance of gentlemens' places, and of the whole country; and thoſe who underſtand the ſubject will allow, that there is a great danger of the change being made for the worſe. Scotland, at preſent, is a pleaſant country, as expreſſive of a peculiar character. If that character is partially changed, the effect will be diſguſting; but, change it completely, and the expreſſion will be infinitely ſuperior to its preſent ſtate, and much more rich and noble than England, or almoſt any other country. *

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* That range of mountains called Pentland Hills, in the neighbourhood of Edinburgh, are well known. Now, ſuppoſe all the country around them wooded, (that is, the trees about gentlemens' places, and the hedgerow timber grown up), while the hills are left naked and bare, in place of being a grand feature in the country, they will be a ſtriking deformity. But, ſuppoſe them properly varied with wood, their paſture, climate and appearance, will be greatly improven; they will be at once the nobleſt ornaments to the country, and of ten times their preſent value to the proprietors.

SECTION V.

OF THE OUTLINE OF PLANTATIONS.

THE outline or boundary of plantations muſt be determined by the *character* which they are to aſſume. As a tree is a picturesque object, ſo, all wood is picturesque; and as the addition of wood to ground is always an addition of picturesqueneſs, though often mixed with grandeur or beauty, hence the propriety of an irregular outline in every kind of plantation.

When the character to be produced is *grandeur*, the bounding line ſhould conſiſt of bold, angular prominences, ſucceeded by deep inciſions, forming large bays and promontories; and to give theſe ſtill greater effect, and vary their outline againſt the ſky, they ſhould be adapted to the variations of the ground, the bays being in the hollows, and the promontories on the eminences.

In this mixture of curves and ſtraight lines, the former ſhould generally be obtuſe and convex, and the latter of conſiderable length. All ſhould appear 'irregularly great.'

Plantations made on hills ought always to aſſume the character of grandeur. Thoſe introduced among cultivated fields, and bounded by ſtraight lines, may have a very grand effect, if due regard be had to vary their outline, by attending to the angular inſertions of hedgerows or belts; though, in this caſe, it is impoſſible to avoid a degree of formality which is always connected with cultivation, and which, being eſſential to it, may be conſidered as a beauty.

When a plantation is to be made of a ſize which does not aſſume the character of grandeur, the outline ſhould be compoſed of ſuch a mixture of ſtraight and curved lines as will relieve each other, produce *variety* and intricacy, and correſpond with the ſurface of the ground. Nothing can be more unnatural or inſipid, than a ſerpentine line, or a line wholly compoſed of curves, as a boundary of a plantation: it is totally void of variety and intricacy, and deſtitute of force and ſpirit, which is one great object obtained by planting, and which it is the peculiar property of irregular or pictureſque forms to give.

The outline, where ornament is a principal conſideration, ſhould be broken by ſingle trees and groups, ſo diſperſed, as to increaſe its irregularity, and take away from that formality and ſameneſs which lines of every kind have, when viewed alone. Thoſe who attempt this, without underſtanding effect,

fect, clog up the bays and receſſes, in place of making them appear deeper and more intricate; and thus they do much more harm than good.

The outline is alſo greatly varied, and much improved, by mixing low growths with timber trees along the boundary of the plantation; and afterwards by taking away the fence, and making partial inroads among ſuch undergrowths, of different forms and degrees of depth.

In open groves, where the trees ſtand ſingle, and have no fence, the outline is eaſily varied, and with great effect.

The different forms, colours, and ſhades of green, when no other mode is applicable, may often have a ſurpriſing effect in apparently varying the boundary of a plantation. I am perſuaded alſo, that when a plantation is newly made, a very great deal might be done by party-colouring the paling with which it is encloſed.

Groups and thickets, when planted, in place of a circular fence, like a clump, ſhould always have the moſt irregular outline. This irregularity is apparently increaſed, by mixing low with tall growths at planting; by removing the fence when theſe are grown to a certain height; and by judicious thinning.

The great beauty of ſmall groups and ſingle trees, ariſes from their connexion,* and the bends and inclinations of their ſtems. This may be produced, by planting two or more trees or ſhrubs in one hole, of different kinds, or the ſame kinds, of different ſizes, &c. and connecting theſe by others ſtraggling around them. The moſt beautiful examples for this work are to be found in natural foreſts, or in woody banks and commons, where trees have ſprung up accidentally.

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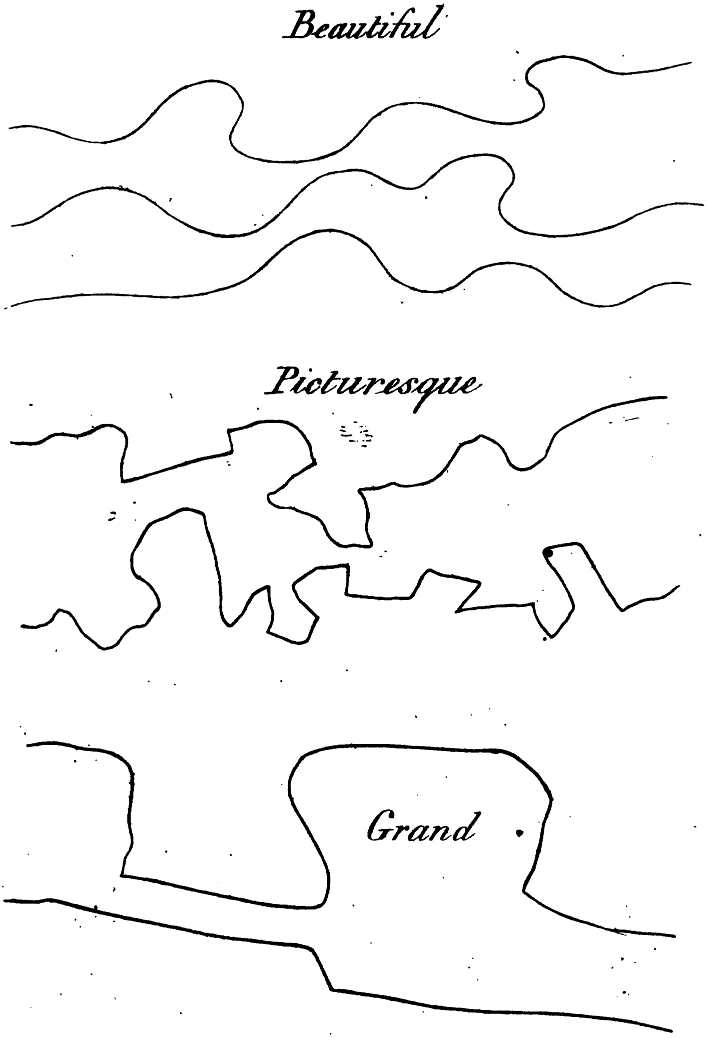
* 'In the *Liber Veritatis*, conſiſting of above three hundred drawings by Claude, I believe there are not more than three ſingle trees. This is one ſtrong proof (and I imagine the works of other painters would fully confirm it) that thoſe who moſt ſtudied the effect of viſible objects, attended infinitely more to connexion than to ſeparate forms. The practice of improvers is directly the reverſe.' *Price's Eſſays*, Vol. I. 321.

How different from all this are the circular clumps, the ſerpentine belts, and the dotting of ſingle trees by landſcape gardeners! From their formal outlines and equidiſtant mode of planting, more than from any other error, ariſes that diſtinctneſs and monotony, which is ſo diſguſting in made places, and which will ever diſtinguiſh a tree, or a collection of trees, planted by them, from the ſame tree or trees in natural ſcenery. ‘ It is moſt amuſing to ſee the *number of days* occupied, and the labour and difficulty they have in ſtaking out the ſerpentine ſweeps of a plantation of two or three acres, which, if nature were followed, might be traced by the

Pl. II.

OUTLINES of NEW MADE PLANTATIONS



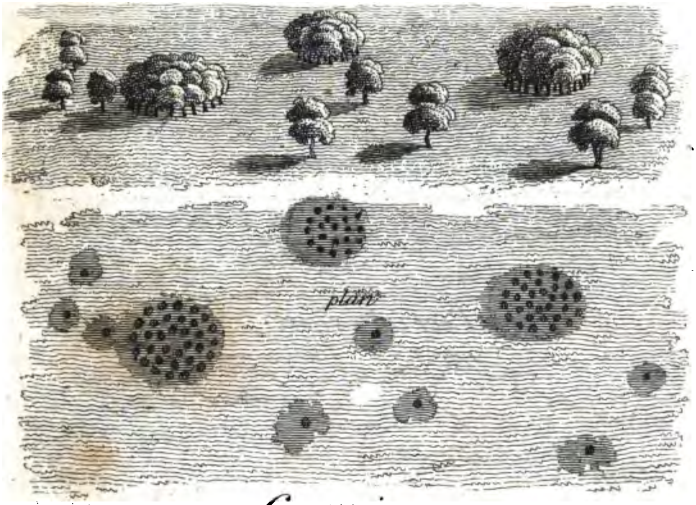
J. Loudon Del. F. Lamb Sculp.

Face P. 93.

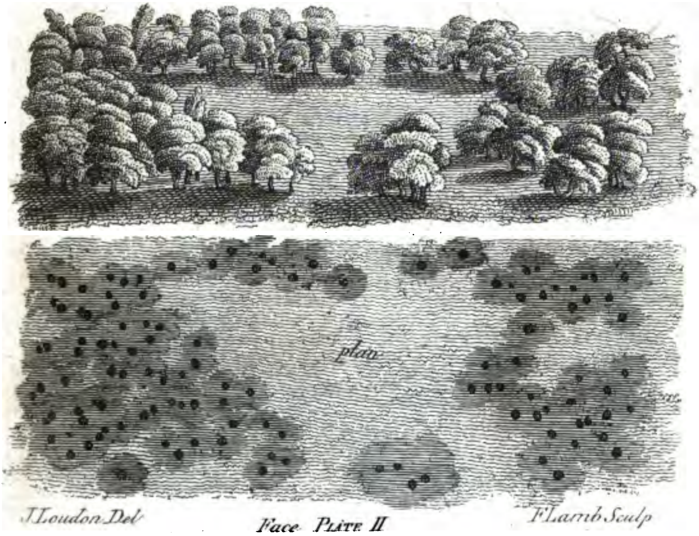
Pl. VIII

CLUMPS & GROUPS Compared

Clumping & Dotting



Grouping



J. Loudon Del. Face Plate II F. Lamb Sculp

the plough, after the footſteps of a deſigner, in two or three hours.' *

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* See the Sketches in Plate II.

SECTION VI.

OF THE DIFFERENT KINDS OF PLANTATIONS.

THESE may be reduced to—

A grove, or a collection of trees without undergrowth;

A wood or forest, or a collection of trees with undergrowth;

Copsewood, undergrowth alone.

Groves are of two kinds. *The first* is generally made for ornament in parks. They are unenclosed; admit the paſture to grow below them; and they appear, when walking through them, as a large collection of ſingle trees.

The second are compoſed of the pine or fir tribe. They are commonly planted on hills, moors, or commons; they are thicker than the former; they effectually prevent the growth of paſture; and they are for the moſt part encloſed. The character of the former is generally beauty and grandeur; of the latter pictureſqueneſs and ſome degree of grandeur.

Groves are at firſt planted equally thick with other plantations. As they grow, they are gradually thinned out, until the trees left ſtanding, are able to defend themſelves from cattle. The fence is then removed or deſtroyed, the outline varied, and the ſpaces betwixt the trees ſown with graſs ſeeds.

Fir groves are often allowed to remain without thinning, until they are fifteen or twenty years old; and then they are conſidered as a full crop, and cut regularly over.

A wood is well adapted for both ornament and utility. It is formed, at firſt, by planting timber trees at ſuch diſtances as would form a grove, and filling up the interſtices with the kinds intended for undergrowth.

This is the moſt generally applicable kind of plantation, and commonly the moſt profitable, particularly in ſtrips and belts. There, the undergrowth grows beſt; thickens the ſtrip below; completes the ſhelter; and, by concealing the real breadth, gives a maſſiveneſs and grandeur to narrow plantations, which they can never have, if planted in the grove ſtyle.

Oak undergrowth is generally the moſt proper; and, if its value were fully known, many plantations might be made of double their preſent value, be much more characteriſtic, and afford better ſhelter.

Moſt plantations, particularly in Scotland, though they generally go under the name of woods, are in reality of the grove kind; we find none of the trees kept decidedly under the reſt, cut over, and allowed to ſpring up again, while a certain number, from 15 to 30 feet diſtance, are preſerved until their timber be full grown; but the trees being once planted, are allowed to grow up together, a few being thinned out where they are too much crowded (an operation to which by far too little attention is paid); Thoſe taken out, are either cut over, or grubbed out by the roots, as is found moſt convenient, without any regard to propriety; and in conſequence of this management, a few buſhes of undergrowth are found in ſome places, and the reſt of the ground, if not ſhaded too much by the crowded trees, is covered with paſture; and neither the paſture, nor the undergrowth, from being intermixed, can be turned to the advantage of the proprietor.

There are other plantations where undergrowth exiſts among timber trees in a more general way, but of kinds which are of little or no uſe, except for fuel; and this is far from being a profitable article, particularly in a coal country.

But, on the other hand, there are woods in ſome places where both timber and undergrowth are cultivated; and it is from ſeeing the great profits obtained by the proprietors of theſe, that I make the following obſervations on the advantage of raiſing oak undergrowth in woods.

The high price given for oak bark is pretty generally known; and the ſum given for an acre of *oaks*, from 12 to 25 years old, for the value of the bark alone, is very conſiderable. Among the inſtances that occur to me at preſent, the Duke of Athol's at Dunkeld appear the moſt proper to be mentioned. There, on land worth little or nothing in aration or paſture, are oak woods, principally natural, the undergrowth of which is ſold every twenty-five years, at the rate of 35l. or 60l. *per* acre;* the purchaſer being at all expence of cutting, carriage, &c. This is from 25s. to 48s. *per* acre *per annum*, independently of the value of the trees left, fifty of which may ſtand on each acre.

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* The ſtatute acre is underſtood here.

If the ſoil and expoſure of theſe woods be taken into conſideration, the growth of the trees will appear conſiderable. But I have obſerved that oaks do not grow half ſo faſt at Dunkeld as they do in the low and comparatively ſheltered grounds of the Lowlands of Scotland, or in England; and I am confident, if oak woods were planted (or at leaſt undergrowths of oak, in woods of any other deciduous tree) in theſe diſtricts, it would afford at leaſt double the profit it does in the Highlands: it would grow equal in ſize to Dunkeld undergrowth in twelve or thirteen years, and afford two cuttings in place of one. At Dunkeld, many places in the woods are too thin, and other parts are covered with birches; but where artificial plantations are to be made, the plants could be placed regularly thick, which of courſe would produce a much more uniform crop, and alſo make a given ſurface more profitable.

Leſt, however, I ſhould be thought in any degree to make oak undergrowth appear more profitable than it really is, I ſhall only ſay, that, in moſt cold, hilly ſituations in Scotland and Wales, it will produce upwards of 2l., and in more favourable ſituations upwards of 4l. *per* acre *per annum*; and I do not heſitate to add, that the profit would far exceed theſe ſums in both caſes, were proper culture beſtowed upon the plants.

This profit is independent of that of the timber trees; and if we ſuppoſe fifty, or ſay only forty, are cut every fifty years from each acre, at 5l. each, this is 4l. more, or in all from 6l. to 8l. *per* acre *per annum* for oak woods; and I am ſure no one will allege that theſe calculations are in the leaſt degree overrated.

Another conſideration which ought to operate as ſome inducement to plant oaks, is the eaſy charge with which it may be accompliſhed. It is beyond a doubt the ſpeedieſt, and in every reſpect the beſt method, to raiſe oaks from the acorn,* by ſowing them at once where they are finally to remain. Now, three or four buſhels are abundantly ſufficient for an acre, which, at 5s. *per* buſhel, is for the whole acre much below the price of a ſingle thouſand tranſplanted trees of any kind; and tranſplanted oaks, which would coſt nearly double that price, would, in the ſpace of four years, be at leaſt three years behind them in point of ſize, both kinds being planted at the ſame time.

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* An acre of oaks affords a greater quantity of vegetable product than the ſame ſpace occupied with any other tree. This is owing to the tap-root of the oak penetrating many feet below the ſurface, and deriving the principal part of its nouriſhment in the bowels of the earth, where no other tree can reach. It is from the tap-root principally that this tree increaſes in ſize, although it will live many years with horizontal roots only. This is a moſt important fact, well deſerving the attention of planters. See *Miller's Dict.* art. *Quercus.* See alſo *Hunter's Georgics*, vol. VI. 442, &c.

Suppoſing the ground, then, on which an oak wood was to be planted, ſummer-fallowed and trench-ploughed at 2l. *per* acre, and ſown broad-caſt before the laſt ploughing with acorns, the total expence (making an ordinary allowance for the proportion of the expence of encloſing) would be only 3l. 5s. or 3l. 10s. *per* acre. *

Or, if it were deſirable to have the undergrowth oak only, and the timber trees of ſome other kinds, then 250 aſh, beech, or elm, on each acre, (which would afford a diſtance of more than twenty feet between each tree) could be planted immediately after the acorns were ploughed in, at an expence not exceeding 10s. *per* acre more, or 3l. 15s. or 4l. *per* acre in total. And

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* See page 118, Note.

I appeal to every one, whether plantations, with the ſoil thus prepared and planted, for 4l. 10s., would not far exceed in growth thoſe where the ſoil is uncultivated, but which are pitted and planted with tranſplanted oaks, at the rate of 8l. or 10l. *per* acre. If the method which I contend for is the beſt, it ſurely deſerves the ſerious attention of gentlemen who plant ſeveral hundreds of acres by this laſt mode.

It is not my intention, however, to recommend the formation of woods, excluſively of groves or coppices; on the contrary, there are thin ſoils, with bad under ſtrata, where fir groves are more profitable than any other kind of plantation: and there are ſteeps and rocky banks, where no tree can be ſo advantageouſly cultivated as the common aſh; and rich moiſt places, where no plantation will turn out ſo profitable as oſiers. But, generally ſpeaking, it may be ſafely aſſerted, that *woods* are the kind of plantation that ought to be moſt generally formed; and that though the kind of timber grown in theſe woods muſt vary according to the conſumpt of different places, yet that oak will be found the beſt and moſt profitable undergrowth.

Copſewood alone is ſeldom deſirable in point of character, though, in many places, it is the moſt profitable kind of plantation. Their formation is ſimple: when they are of a proper ſize they are cut down; after which, the ſtools ſpring up; and this operation is repeated periodically. Copſewoods, however, are in general wretchedly managed, particularly in England.

Wherever a plantation is to be made, it is of great conſequence to fix upon the proper kind. In determining this, the kind of woods, and ſpecies of tree in the ſurrounding country—the market—the preſent or probable expence of carriage by land or water—and a variety of other circumſtances are to be conſidered, and that kind fixed upon, which ſhall in the end turn out the moſt profitable. The plantation being made, the particular kind ſhould be held ſtrictly in view in their after management. A collection of oaks intended for a grove, if not gradually thinned out as they grow up, will never ſucceed; but if the ſame collection were intended for a wood, thinning them out, in place of cutting over, would leſſen the crop of undergrowth. Again, a collection of firs will never become a wood, nor a collection of thorns a grove.

In planting, few have any idea of making one kind of plantation more than another;—a certain ſpace is to be planted, and it is juſt filled up with trees, no matter of what kinds.

From this neglect alone, independently of all others, (ſuch as preparing the ſoil previous to planting, cultivating it afterwards, training and thinning, &c.), few plantations yield one third of the profit which they might do. But when the kind of plantation to be formed is previouſly fixed upon, then a proprietor, who intends to lay out money in this way, can ſay—Here I ſhall plant *a wood;* it will coſt juſt ſo much at firſt; in ſo many years, the undergrowth will yield a certain ſum; it will do ſo always at the return of the ſame period; ſo many timber trees will ſtand upon each acre, which, at ſuch a time, will yield ſo much: And all theſe returns is juſt ſo much *per cent.* for the money which I have laid out; and, after deducting all expences, my profits will ſtand thus, &c.

Here again I make *a coppice:* Such a tree is the moſt profitable to plant; I can plant ſo many acres for ſo much; and theſe will yield ſo much *per* acre in ſuch a time, and the ſame periodically afterwards.

In another place I plant *a grove:* It coſts me ſo much; in a certain number of years I will commence thinning; in ſo many years more I ſhall have thinned out juſt ſo many trees, at ſo much each, and left ſo many remaining on each acre. Now, I ſow graſs ſeeds among theſe trees, and next year it will afford me ſo much *per* acre for paſture; which it will continue to do for ſo many years; until, at laſt, I cut down the full grown timber, when each tree will afford ſo much; or my total expence will ſtand thus, &c.

But, mix all theſe different kinds of plantations, and the ſpecies of tree ſuitable for each kind together, as is commonly done, and what can be ſaid about them? Who can tell the expence of a plantation? Or to what advantage can ſuch plantations be turned? The proprietor muſt feel great difficulty in directing their general management, and great uncertainty as to what they ſhould produce; nor has he any kind of check upon either the manager, the buyer, or the ſeller of his timber. But, by the mode which I recommend, he has a certain object in view in every plantation, even in every hedgerow or ſingle tree which he plants or may poſſeſs; and all his operations tend to promote this object: In this way he operates, though not with an abſolute certainty of the profit and loſs, yet with ſuch clear ideas on theſe heads, that he can never be at a loſs how to proceed, nor ever greatly diſappointed in his expectations.

SECTION VII.

OF SHELTERING YOUNG PLANTATIONS.

SHELTER is a moſt powerful promoter of the growth of vegetables: it is peculiarly neceſſary for many kinds of young trees in all expoſed ſituations: but there are ſome kinds that will endure the moſt ſevere expoſure; and the tenderer kinds are ſheltered by intermixing ſome of theſe hardier ſorts among them as nurſes.

A nurſe plant ſhould be of a quick growth, eſpecially when young, and endure the particular expoſure, in which it is to be planted, better than the tree that is to become principal. We have ſeveral quick-growing kinds adapted for all the different degrees of expoſure, from the ſea-ſhore to the tops of the higheſt hills; * and thoſe undoubtedly are the beſt that can be employed for this purpoſe.

The proportion of nurſes planted to the principal trees, muſt vary according to the expoſure, and the degree of ſhelter neceſſary: in ſome caſes, there may be one half of the whole, nurſes; in others, not above one twentieth part.

It may ſometimes happen that more than one half are nurſes; and in that caſe, as the whole grow up, a few of them ſhould be removed, and more of the principal tree planted in their room, eſpecially if the plantation is intended for a wood: but this caſe can rarely occur, except in ſituations near the

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* See Sect. II. on the Characteriſtic Differences of Trees and Shrubs.

the ſea; for the larch * is at once the moſt valuable tree, and the one that will beſt endure every kind of expoſure.

Nurſe plants have long been introduced into plantations; and although they have, in almoſt every inſtance, tended to ſuffocate and overpower the principal trees, rather than promote their growth, the idea is good; the bad conſequences reſulting from the practice have ariſen from improper management.

Nurſes, however, have at all times a tendency to exhauſt the ſoil, and deprive the principal tree of its proper nouriſhment. For this reaſon, they ſhould be planted with great

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* The inſect which, for three years paſt, has infeſted the larch, has greatly limited the quantity of that tree planted in Scotland. But thoſe planted from thirty to fifty years ago have, in every ſituation, grown to large timber trees; hundreds of which may be ſeen in many parts of the country, from one to four feet diameter. This ſhews that the ſoil and climate ſuit the tree; and it is to be hoped a few years will remove the inſect and its pernicious effects.

great caution. In moſt ſituations, the principal trees, if planted ſufficiently thick, will ſhelter one another; they may not indeed be ſo tall at the end of a given period, as if they had been ‘drawn up’ by nurſes; yet they will be much more ſtrong and hardy, and better calculated to produce timber, and reſiſt the weather ever afterwards. Where ornament is taken into view, this mode ſhould almoſt always be followed. The incongruity produced by mixtures, and particularly by many nurſes, which are generally of ſpiry forms, with other round-headed trees, is quite incompatible with every idea of beauty or variety. Another bad effect is, ſuch plantations always appear young, without giving any of thoſe ideas of youth and beauty, that young plantations, compoſed of kinds varied, but not mixed, or even young trees ſimply conſidered, never fail to communicate.

SECTION VIII.

OF THE PREPARATION OF THE SOIL PREVIOUSLY TO PLANTING.

NOTWITHSTANDING all that has been written upon this ſubject, and the many facts brought forward to prove the propriety and ultimate economy of preparing the ſoil previouſly to planting; the operations of moſt gentlemen ſhew that they are doubtful of the ſubject, or ignorant of its importance. It is needleſs, however, to add any thing to what has already been ſaid; for it is unreaſonable even to ſuppoſe that a ſquare yard of earth, matted and conſolidated with the roots of heath or graſs, can be penetrated by the delicate fibres of a young plant juſt brought from the nurſery; and ſtill more abſurd to imagine that it can find ſufficient nouriſhment in the compaſs of the pit in which it has been planted. Thus, in plantations made by pitting and planting, whatever be the nature of the ſoil, it will frequently be found, that to ſupply the deficiencies by death that occur for two or three years after planting, will require a ſum equal to that which would have prepared the ſoil; while thoſe that ſurvive are ſo choked with graſſes or heath, and become ſo coated with moſs as to make no progreſs. The pine and fir tribe, it is true, are leſs liable to this than others, as they ſoon cover the ſurface, and deſtroy all vegetation; but I apprehend that the deciduous kinds are more checked by it than moſt people imagine.

But where the ſoil is prepared, the plants ruſh up to trees with vigour and alacrity, and ſoon begin to yield returns to the owner. Nor is the additional expence of preparing the ſoil conſiderable; in many caſes, it will be more than repaid by the green crops, as potatoes, turnips, &c. which may be raiſed on it for two or three years after planting; and where no green crop can be raiſed, the ſaving in plants and planting, (as few or none require to be replaced), will entirely or nearly defray the expence of preparation.

Thus, independently of timber produce, it appears that the additional expence of preparing the ſoil will generally be repaid the ſecond or third year after planting; if not poſitively by vegetable produce, at leaſt negatively by preventing further expences. But if we conſider the returns in timber produce, it may appear aſtoniſhing that any ſhould be ſo blind to their own intereſt as to neglect the preparation of the ſoil. If we ſuppoſe that trees grow only twice as faſt where the ſoil is prepared, as where it is not, then a plantation worth 100l. in fifty years, had the ſoil been prepared, would have been worth 200l. in the ſame time, or worth 100l. in twenty-five years. But every one will allow that all kinds of deciduous trees will grow four or ſix times, and often ten times, faſter in prepared, than in unprepared ground; and, of courſe, the return of profits will be correſpondent.

The ground being drained and cleared, as far as neceſſary, of ſurface incumbrances,* the mode of preparing the ſoil will vary according to circumſtances.

Where a conſiderable extent is to be planted, the ground ſhould, if poſſible, be prepared by the plough; † by autumn or ſummer fallowing; or, in very rough moors, &c. by fallowing two ſeaſons; and trench-ploughing ſhould be added to the fallowing wherever it can be accompliſhed. This mode decompoſes the organic matter, and pulverizes the ſoil much more completely than trenching with the ſpade, while it will not coſt above one third the expence. *

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* He that for wood his field would ſow,
Muſt clear it of the ſhrubs that grow,
Cut brambles up, and the fern mow.
BOETHIUS, Book II.

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† Then ſee your hopeful grove with acorns ſown;
But, ere your ſeed into the field be thrown,
With crooked plough firſt let the luſty ſwain
Break up, and ſtubborn clods with harrow plane.

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To barren ground with toil large manure add;
Good huſbandry will force a ſoil that's bad.

RAPIN.

————Foſtered thus,
The cradled hero gains from female care
His future vigour: but, that vigour felt,
He ſprings indignant from his nurſe's arms;
He nods the plumy creſt, he ſhakes the ſpear,
And is that awful thing which Heaven ordain'd
The ſcourge of tyrants, and his country's pride.

MASSON'S *Engliſh Garden.*

In places inacceſſible to the plough, the ground ſhould be prepared with the ſpade, either by digging or trenching.

In ſteep banks, or places much covered with ſtones, or other impediments to digging or trenching, or where there may be danger of the winter rains carrying away looſe ſoil, pits ſhould be made the ſummer previous to the planting ſeaſon.—One pit being opened, the earth of the next ſhould be

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* Where extenſive plantations of deciduous trees are to be made, ſowing will generally be found the moſt profitable mode; and there are many caſes (as in old moory paſtures) where a ſingle furrow would be abundantly ſufficient to prepare the ſoil for this purpoſe. If acorns were to be ſown, they might be ploughed in; or aſh, beech, &c. might be ſown immediately after the ploughing, and then harrowed in. Thus, thouſands of acres might be planted under the expence of 20s. per acre, which would proſper better than thoſe which coſt half as many pounds.

be thrown into it, with the ſurface undermoſt. By the time the pit is re-opened, the ſward will be rotted, and ſhould be incorporated with the reſt of the ſoil in putting in the plant.

Other places ſtill more difficult may be planted by flits; or by putting in acorns, aſh keys, or other tree ſeeds; many of which will grow in crevices of rocks and precipices, where little or no earth can be ſeen.

SECTION IX.

OF THE SIZE OF THE PLANTS, AND MODE OF PLANTING OR SOWING.

EXPERIENCE has ſhewn, that where there is any degree of natural ſhelter, and eſpecially where the ſoil has been prepared, plants that have been tranſplanted in the nurſery, and that are from eighteen inches to three feet high, are the moſt proper to be choſen, and planted from four to ſix feet aſunder irregularly.

In expoſed places, where ſhelter is to be obtained only by planting thick, or by planting nurſes, tranſplanted plants, under eighteen inches high, ſhould be choſen, and planted from thirty inches to four feet aſunder. The diſtance betwixt the plants, in both theſe caſes, will vary much, according to ſoil and other circumſtances. The margins of extenſive plantations, and narrow ſtrips or patches, ſhould be thicker planted than the inſide of a great extent, though in the ſame expoſure; on the other hand, where the ſoil is a deep loam, they may be placed wider than where it is thin and gravelly.

In very extenſive plantations, it becomes an object to plant in rows, as thus the trees may be more eaſily cultivated. In many caſes, this may be done to great advantage with the plough and horſe-hoe; and often, particularly in England, vegetables might be [illegible]roduced betwixt the rows with great propriety.

In all ordinary plantations, the plants ſhould be put in irregularly; and whereever

ever ornament is in the leaſt degree attended to, *irregularly irregular*, juſt as if they had grown up by chance from the ſeed, or as we ſee in natural foreſts; where often two or three trees appear to ſpring from one root, and the reſt ſtraggling around, in ſome places thick, and in others thin. This produces an endleſs variety of grouping, and at the ſame time as many trees, equal, in timber produce, to the ſame number on the ſame ſpace, planted at regular diſtances. Neglect of this kind of irregularity is what diſguſts every man of taſte, when he looks at artificial ſcenery; and ſurely nothing can be eaſier than to copy nature, and pleaſe.

The different modes of *inſerting* the plants, are either by pitting or ſlit-planting, which are the beſt modes; or by dibbling, which, however, can ſeldom be practiſed with propriety.

Planting the pine and fir tribe, I conſider as more economical and expeditious than ſowing; but moſt of the deciduous trees, and particularly the oak and aſh (which ought to be the deciduous ſorts moſt generally grown) ſhould be raiſed from the ſeed, where they are finally to remain.

An acorn put in the ground at the ſame time with an oak five or ſix years old, will overtop it in ſeven years,* and often ſooner; and Miller ſays, that they laſt much longer, and produce more valuable timber.† Wherever

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* 'We have known an inſtance of tranſplanted oaks remaining upon the ground ſo long as eight years, before they began to move.'—*Marſhall's Planting*, vol. I. p. 122. ſecond edition.

† 'When oak trees are cultivated with a view to profit, acorns ſhould be ſown where the trees are deſigned to grow; for thoſe which are tranſplanted will never arrive to the ſize of thoſe which ſtand where they are ſown, nor will they laſt near ſo long. For in ſome places, where theſe high trees have been tranſplanted with the greateſt care, they have grown very faſt for ſeveral years after; yet are now decaying; while thoſe which remain in the places where they

ever the ſoil is prepared, and it is deſirable to raiſe oaks, it will be found preferable to ſow acorns; which may be done at one fifth

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they came up from the acorns are ſtill very thriving, and have not the leaſt ſign of decay. Therefore whoever deſigns to cultivate theſe trees for timber, ſhould never think of tranſplanting them, but ſow the acorns on the ſame ground where they are to grow; for, timber of all thoſe trees which are tranſplanted is not near ſo valuable as that of the trees from acorns.'—*Millar's Dict.* art. *Quercus.*

This paſſage ſhould be underſtood in a limited ſenſe. It has been uſed, by ſome, to ſhew that no oaks ought, on any account, to be tranſplanted. In my opinion, however, it amounts only to this—that oaks ſhould not be removed at ſuch an age that they cannot, nor upon a ſoil where they will not puſh down tap-roots: for upon theſe two things depend the quantity and quality of the timber. Without a tap-root, an oak may live a long time, but will not increaſe in ſize.—See, as a proof of this, an excellent paper in Dr Hunter's Georgics, vol. VI. p. 442.

All tranſplanted oaks under ſeven years old, when finally removed, ſhould be cut over by the ſurface, in the ſecond or third year after they have taken with the ſoil.

fifth the expence of planting; and they will turn to advantage, either as timber or undergrowth, much ſooner. As oak is a peculiarly valuable tree, both for its bark and timber, it ſhould be univerſally planted; and were this mode attended to, it would be a ſaving, even in the firſt inſtance, of from 3l. to 6l. an acre, which, to gentlemen who plant extenſively, would be of conſiderable importance. (*See* Sect. VI.)

With reſpect to the mode of performing the operation, acorns might be ſown either in drills or broad-caſt, and *ploughed in* in autumn; and where any other ſpecies was intended to be grown among them, they might be planted; or, if theſe were the aſh, beech, or elm, they might be ſown, the following ſpring. In ſmall plantations, where the plough could not be uſed in ſowing, they might be put in either with a ſpade, hoe, or planting inſtrument.

SECTION X.

OF THE CULTURE OF THE SOIL IN PLANTATIONS.

The culture of the ſoil, or at leaſt the keeping of it free from weeds, is of material conſequence in promoting the growth of vegetables; when this is not attended to in plantations, the young trees are often more liable to be choked by graſs or weeds, than if the ſoil had not been prepared. This is evident; for if the ſoil, by preparation, is better adapted for the growth of trees which are foreign to it, it muſt be much better adapted for the growth of weeds, which it produces naturally in abundance. To check theſe, then, ſo that the roots of the trees may range at liberty, and enjoy the full ſtrength of the ſoil, muſt be an object of conſiderable importance to the planter.

The kind of culture moſt proper to be followed, will vary according to the nature of the plantation. Wherever the ground will produce vegetables, as potatoes, turnips, beans, &c. a few of them may be planted or ſown in the centre of the intervals (where the roots of the trees do not reach) for a year or two after planting. This neceſſarily ſuppoſes that the whole will be dug and cleaned annually during that time; and afterwards it may be hoed, two or three times a year, until the trees cover the ſurface, which will generally be the fourth or fifth year after planting.

In extenſive plantations, all this may be performed by the plough and horſe-hoe; except perhaps a little hand-hoeing next the plants, where the other inſtruments did not operate. And, In plantations where, from different circumſtances, it may be found impracticable to introduce the plough, the ſpade and hand-hoe naturally preſent themſelves.

In caſes where the ſoil will not produce vegetables, or at leaſt where it may not be thought adviſeable to cultivate them, the ground ſhould be kept clear of weeds by hoeing only; or by digging or ploughing a year or two at firſt, and afterwards by hoeing.

Whenever trees cover the ſurface of the ground, there is no further need of culture; the ſoil afterwards is kept abundantly porous, and the ſurface ſufficiently free from weeds, by the ſhade of the trees and the falling of the leaves annually. This is particularly the caſe in woods and groves of reſinous trees. It is the peculiar property of deciduous groves, that the ſurface among them is covered with paſture, which ſhould be ſown when the trees are about nine inches or one foot diameter; previouſly, they ſhould be kept free from weeds.

SECTION XI.

OF PRUNING PLANTATIONS.

PRUNING, though not ſo important in plantations as thinning, is of conſiderable uſe. It corrects the extravagancies, and lops off the redundancies of trees, and directs their produce into a proper channel.

Two trees of the ſame kind planted in like ſoils and ſituations, the one pruned, and the other left to nature, may produce in a given number of years the ſame weight of timber: but the one that was pruned would contain the greater part of that timber in an erect ſtem; while the one, left to nature, would contain great part of it in arms and ſide branches. Hence, if the object was ſhip-building, as is moſt likely, the natural one was preferable; but if it was wainſcotting, the other was undoubtedly the moſt profitable tree. But the larch, without any pruning, is the beſt for the purpoſe of wainſcotting; and the oak, without any pruning, is the moſt proper for ſhip-timber. This, and other inſtances that might be given, would ſeem to point out that trees, both as to the quality of their wood, and their mode of growth, are by nature fitted for certain purpoſes in the arts of life; and this again tends to prove that pruning is unnatural and unneceſſary.

From different circumſtances, however, it often becomes neceſſary to uſe trees for purpoſes which they are not naturally deſigned for. Before the larch was known, or where it could not be had, it was neceſſary to train the oak for wainſcotting; and where the larch alone will grow, and ſhip-timber is requiſite, it may be neceſſary to prune or bend it to the form that will ſuit the ſhip-carpenter, as is explained in Plate I. * If

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* 'I conclude with recommending the bowing and bending of young timber trees, eſpecially oak and aſh, into various flexures, curves and poſtures, which may be done by humbling and bending them down with tough bands and withs, or hoops, either cut ſcrew-wiſe, or ſlightly haggled and indented with a knife, and ſo ſcrewed into the ground, or by hanging of weighty ſtones to the tops or branches, till the tenor of the ſap, and the cuſtom of being ſo conſtrained, do render them apt to grow of themſelves, without power of redreſſing. This courſe would wonderfully accommodate materials for knee-timber and ſhipping, the wheelwright and other uſes; conform it to their mould, ſave infinite labour, and abbreviate the work of hewing and waſte.

—— *adeo in teneris consues ure multum est.*

Virgil, it ſeems, knew it well, and for what purpoſe;

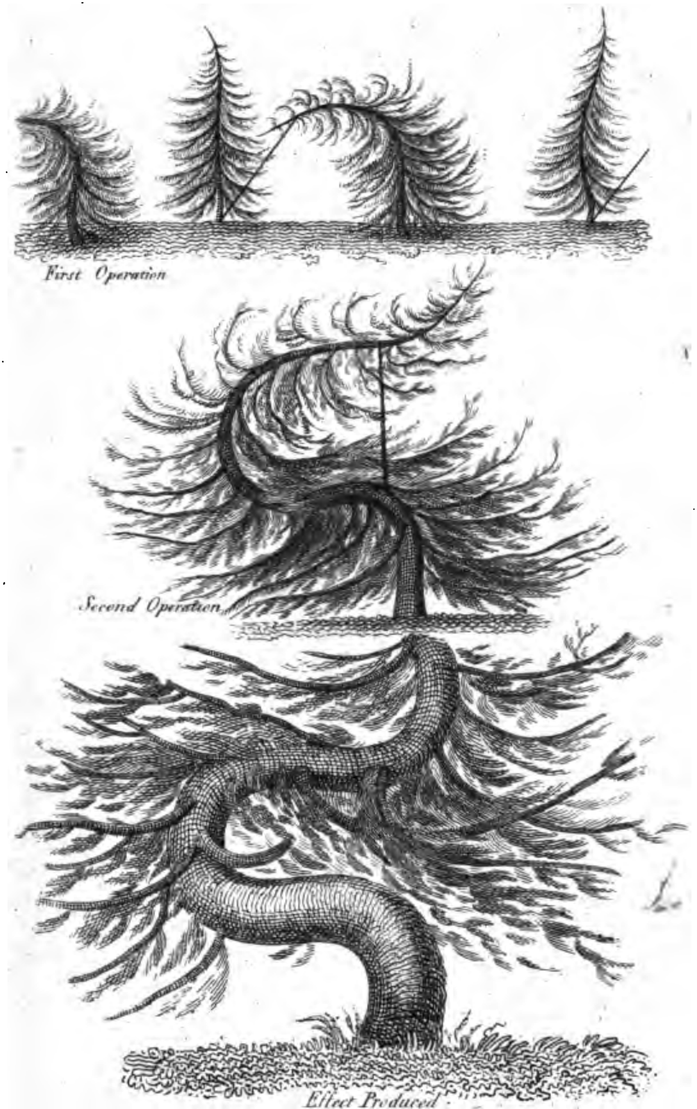
Continuò in silvis magna vi flexa domatur
In burim, et curvi formam accipit ulmus aratri.

Georg. II.

When

PL. 1.

BENDING the LARCH to Produce SHIP TIMBER



J Loudon Del. F Lamb Sculp.

Face P. 132.

If we conſider the aſh, the elm, the beech, &c. we ſhall find that they are wonderfully adapted by nature, without any pruning or culture, further than to be planted in their natural ſoils and ſituations, for the ſeveral uſes and purpoſes for which they are applied. But, reverſe or intermingle their applications, and pruning then (and then only) becomes neceſſary. In pruning, the great art is, to attend to the purpoſes for which the timber is to be applied; and this will naturally lead to the beſt manner of performing the operation.

However, in artificial plantations, a good general rule may be, to conſider pruning as the means of throwing more timber into the trunk or principal ſtem, whatever direction that may have aſſumed by nature; and in all plantations where ornament is the prin-

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When in the woods with mighty force they bow
The elm, and ſhape it to the crooked plough.
Hunter's Evelyn's Sylva, 480.

cipal conſideration, the trees ſhould be left entirely to nature.

Pruning ſhould commence after the trees have been five or ſix years planted, and continue until they are nearly full grown. In performing the operation, no tree ſhould be ſuddenly diveſted of all its ſide ſhoots. A ſufficient number of ſmall ones ſhould always be left to circulate the ſap through the tree. Theſe branches never become principal, and, of courſe, cannot ſpoil the trunk. No branches ſhould be pruned from reſinous trees until they ſhew evident marks of decay.

Where pruning is attended to, it is moſt commonly overdone, to the great prejudice of the timber, and the appearance of the tree. Better proof cannot be given than the tall, naked elms, and pollard oaks, that prevail in many places of England, and diſfigure whole diſtricts of the country. The timber of thoſe ſpecies of trees, as every one knows, is the moſt valuable of any; bu after this kind of management, its quality and quantity are much injured, and, being unfit for every purpoſe in the arts, it is commonly uſed as fuel.

SECTION XII.

OF THINNING PLANTATIONS.

THINNING is an operation of much more importance than pruning; and upon it, more than upon any other point of after-management, depends the quantity and quality of timber produce. This operation has been ſo generally neglected in Great Britain, that few plantations contain one half, and many not one fifth the timber they would have contained, had they been properly thinned. The produce of ſome natural foreſts that have never been thinned, might be brought as an argument againſt this affirmation; but from theſe may be drawn the ſtrongeſt arguments for thinning; ſo that even for this unnatural-like *operation*, there may be found a precedent in nature. Natural woods, ſown by birds or the winds upon different kinds of ſurface and various ſorts of ſoil, ſpring up at different times, and of different degrees of thickneſs and vigour. Hence it is eaſy to conceive, that thoſe in favourable circumſtances will ſoon overtop the reſt, and, if they do not kill, will at leaſt weaken them ſo much as not to be affected by them, until at laſt the trees are left at proper diſtances, according to their kinds, and the quality of the ſoil. Thus, though nature be ſlow and tedious in her operations, yet ſhe accompliſhes her purpoſe in the moſt complete manner; and artificial thinning is only aſſiſting nature.

Leaving even natural woods to be thinned by time, would not be œconomical; and thoſe who argue from thence not to thin artificial plantations, do not conſider the difference between them.

In an artificial plantation, the ſoil is equally cultivated, and the plants put in the ground much about the ſame ſize, and at the ſame time. Hence, they ruſh up together like ſo many maypoles, producing neither beauty nor timber: and as, in moſt plantations, the fir tribe have been introduced either for ornament or ſhelter, they have overtopped, and partly deſtroyed thoſe they were meant to nurſe up, and given a moſt unnatural ſameneſs to every part, and to all the artificial plantations in the iſland.

The plantations where thinning is principally requiſite, are thoſe intended for groves. In woods and copſes, none require to be taken out but the nurſe plants, where any have been planted.

Plantations of the fir tribe ſhould be gradually thinned, beginning after they have been five or ſix years planted, and continuing for ten or twelve years; after which time thinning becomes pernicious. Thoſe thinned out ſhould always be grubbed up by the roots; for when theſe are allowed to remain, they check the progreſs of the remaining trees.

Plantations of firs are ſometimes, and very properly, left without thinning, and cut wholly down as a crop when fifteen or twenty years old. This is generally the moſt profitable mode of planting on thin, bare ſoils in the neighbourhood of mines, where wood of this kind is much wanted for ſupports.

Where the fir tribe have been planted as nurſes, they ſhould be grubbed out by degrees as they begin to injure the principal trees.

Groves of deciduous trees ſhould be gradually thinned out after the ſame manner; only, the operation may go on until the trees have arrived at nearly their full ſize. Wherever ornament is in any degree conſidered, thoſe left ſhould not be equidiſtant from one another, but, as formerly mentioned, *irregularly irregular.*

Woods (where undergrowth is always intended if they are properly planted) require no thinning: the whole ſhould grow for twelve or fifteen years, until it is proper to cut over the undergrowth; and at that time the ſtrongeſt trees ſhould be pitched upon, and left as ſtandards.

Copſewoods grow a certain length, according to their kind, and then are cut wholly over by the ſurface; of courſe, they require no thinning, unleſs nurſes have been planted among them; and both in woods and copſes, theſe, as they are removed, ſhould be replaced with the principal tree.

SECTION XIII.

OF INCLOSING, AND OF DIFFERENT KINDS OF FENCES.

HOWEVER well a plantation may be made in the firſt inſtance, unleſs it is well encloſed it cannot be expected to proſper. ‘ But how much cauſe have we for cenſure reſpecting this point! Truly, too much. In many inſtances, we find plantations entirely unfenced! In others a mock ditch or bank, not meriting the appellation; and in others, a rugged hedge or broken wall, with perhaps one yard up, and two down. Can this be called rational management? Is it not the height of careleſsneſs, nay, even a cruelty, to abandon trees, which otherwiſe might ſoon become uſeful, not only to the proprietor, but to the community, to the ravages of cattle?' *

There are a great many different modes of encloſing ſuited to different ſituations and circumſtances, a few of which, with ſome original kinds, I ſhall notice under

Live fences;
Walls;
Fences composed partly of both;
Ornamental fences; and,
Fences for groups and single trees.

Live fences include all kinds of hedges, many excellent ways of rearing which are well known.

Thorn is the beſt plant where the ſoil is good; crab the next beſt. Beech, hornbeam,

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* Nicol's Practical Planter, p. 350.

beam, berberry, &c. where the ſoil is too dry or thin for the thorn. Elder, birch, poplar, alder, &c. where it is too moiſt for any of the above.

Before a hedge is planted, the ground ſhould be well cleaned and pulverized. A ſtrip ſix or eight feet broad may be fallowed and trench-ploughed the preceding ſummer. When the ſoil is naturally good and deep, the thorns may be planted along the centre of the ſtrip; or, if it is thin and too moiſt, it may be planted on double earth, which is accompliſhed by forming a ditch of depth and width according to the water it is to contain, or the cattle it is to defend from the hedge. Every hedge ſhould be well cleaned and defended from cattle for five or ſix years after it is planted; and in the mean time, its ſides ſhould be trained in a tapering form with the hedge knife.

The great art of preſerving hedges fencible, after they are raiſed, conſiſts in keeping them three or four times broader at the bottom than at the top. By this means, every part has the full advantage of the ſun, air, and rain: it grows equally thick throughout, and particularly below, where it is moſt neceſſary. But when a hedge is trained broader at top, or even perpendicular, that half of it next the ſurface is under the drip of the reſt; and, deprived of ſun and rain, it ſickens; produces few or no young ſhoots; the ſap runs all to the top of the hedge; it gets quite bare below; and ſoon becomes unfit for a fence. Every accurate obſerver will allow that this is the caſe, more or leſs, in the greater part of what are generally conſidered as the beſt kept hedges, ſuch as thoſe ſurrounding market gardens in the neighbourhood of towns, which, though they are annually cleaned and ſhorn with great care, are commonly ſo naked below, as to admit hares, dogs, ſwine, &c.

In pruning a hedge, the bill or knife

ſhould be uſed as preferable to the ſhears. They bruiſe off, rather than cut over, the twigs; and hence, every ſhorn hedge throws out a great number of ſmall ſhoots from the ſurface only, which in time forms a kind of coating or net-work all over the hedge, encloſing the naked ſtems within, and excluding them from the air. But the knife cuts off the twigs clean and ſmooth. By this means, they throw out fewer ſhoots, but thoſe are of greater ſtrength; and the hedge is equally thick in every part, without being crowded. This excellent mode of pruning hedges is practiſed in ſome of the ſouthern counties of Scotland, where they are productive of many other advantages.

Walls are generally formed of earth or ſtone. Some are made of ſtone alone; others of ſtone and lime; others of turf, or of turf and ſtone in alternate layers. Some are erected upon the ſurface, as all common walls; others are ſunk into the ground, as the ha'ha' or ſunk fence, &c. &c. When lime is employed, if, in place of ſlacking it, and letting it lye to mellow or ſour for ſome weeks, no more were ſlacked and made ready for uſe than what was worked up the ſame day;—if the ſand were clean and rough, and well incorporated with the lime, and were the coping put carefully on; theſe walls would laſt an inconceivable length of time. Lime uſed in this way binds immediately; and the longer it ſtands, becomes the harder. Hence the ſurface of the wall would acquire a coating of moſſes which would add greatly to its beauty, and prevent decay.

The ancients uſed lime in this way; and their buildings, both walls and houſes, though under every diſadvantage, remain as monuments of their ſuperior knowledge in this particular. But the moderns in general deſtroy their mortar before they uſe it: it is ſaturated with fixt air, or, in common language, has *loſt band* before it is put in the walls: hence the weakneſs, frailty, and ſpeedy decay of modern buildings, thoſe of rubble work in particular.

There are few who will form a proper idea of the importance of this hint. I ſhall only aſk, Whether it is moſt deſirable to build walls that will ſtand for centuries with little or no repair, or to build them in the common way, when, if they ſtand half that time, they have to be *pointed* every eight or ten years; both modes coſting the ſame original expence? *

Fences compoſed of both the above kinds, are various; as the ditch, hedge and paling; the ſunk fence and hedge; and the ditch and hedge with top dike, which laſt is the beſt, the moſt œconomical, and the moſt generally applicable to plantations: a ſmall dike of ſtones, turfs, or any other rude materials

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* See Dr Anderſon's Eſſays.

terials, is raiſed on the top of the earth dug out of the ditch, the medium ſize of which is ‘ thirty inches in height, twenty inches wide at bottom, and fifteen inches broad at top. ’ * (See plate III. fig. 1.)

Any of the foregoing may be made *ornamental* fences: the walls may be covered with ſhrubs, creeping plants, or ivy; the hedges interſperſed with roſes, briars, honeyſuckles, and other ſhrubs or trees, and never ſhorn; and the palings may ſupport climbing plants, ſhrubs, or brambles. †

A number of other fences might be mentioned, which are particularly applicable to ornamental ſcenery; but I ſhall only notice three, which appear to me the beſt.

The *firſt* is uſed for preſerving ſheep only,

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[*] Nicol's Practical Planter, p. 362. firſt edition.

[†] No plant gives a more natural appearance to artificial ſcenery than the bramble; as may be ſeen at the Earl of Selkirk's, St Mary's Iſle.

only, or excluding hares, rabbits, &c. from groups, and ſingle trees; or for encloſing trees on a lawn, or in a ſmall ornamental park where deer or cattle are not kept; ſuch as we frequently find adopted in the garden front of villas in England. Wherever this fence can be uſed, I think it is the ſimpleſt, the cheapeſt, and in every reſpect the beſt.

It is from three to five feet high, compoſed of wire, placed wider or narrower according to the purpoſe of the fence, and fixed to the ground by ſmall poſts of iron at regular diſtances; the whole coated over with the *patent Britiſh inviſible green.*

It will be eaſily underſtood from ſketch 1. plate III.

The *ſecond* kind may be uſed in place of the ſunk fence, and I think it is much preferable in ornamental ſcenery. It is evidently more œconomical.

It is formed by digging a ditch eight or ten feet wide, and two or three feet deep. Plant the bottom of it with thorns, about two feet ſquare, or ſow it with furze: as they grow, cut them down until they become buſhy, and cover the ground; and when they are as high as the ſurface, mow them along with the ſurrounding lawn, and they will have nearly the ſame appearance. It is needleſs to add, that no cattle will venture to tread on them. And planks, painted green, might be laid acroſs, and half concealed here and there, where it might be thought neceſſary.—See a ſection of this fence, plate III. ſketch 3.

An excellent fence might be made for plantations much in the ſame way. The ditch might vary in width; it may be in ſome places twelve or fourteen feet, in others three or four only, the thorns partly mown level with the ſurface, and partly allowed to aſſume their natural magnitude and form. Thus

PL. III.

FENCES

Fig. 1. Section

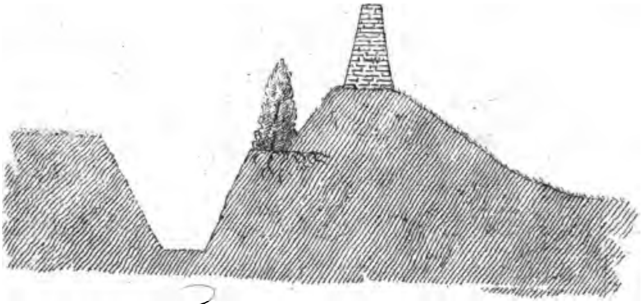


Fig. 2. View

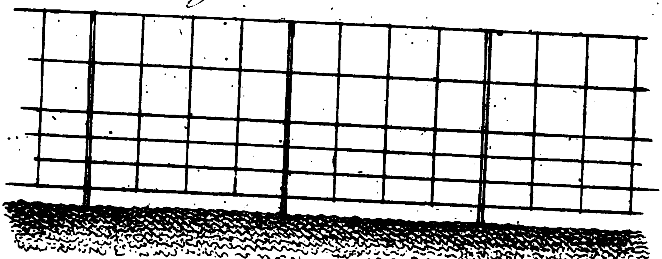
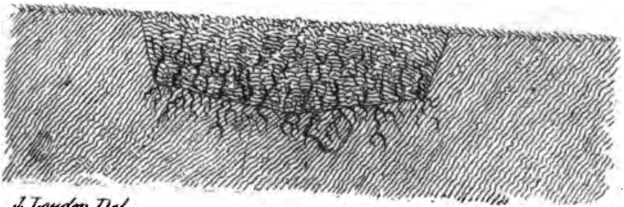


Fig. 3. Section



J. Loudon Del.

F. Lamb Sculp

Face P. 150.

Thus the outlines would be quite open and free, and the fence at the ſame time complete. Or,

The thorns might be planted in the ſame irregular way upon the ſurface of the ground, and partly intermingled with the trees of the plantation: when they have grown five or ſix years, they might be thinned, ſo as to make a varied outline and complete fence.

The *ſunk fence* has been uſed more than any other in ornamental ſcenery; but it is unſeen only when approached at right angles from one ſide. If there are any bends in the line of this fence, or any inequalities in the ſurface of the ground, the wall never fails to ſtrike the eye. A place where they abound is always confined. Should we leave the gravel walk and ſaunter over the lawn, or take a direct road to any object in the park, we are continually pained with the idea of meeting with this invincible barrier, which often ſuddenly intrudes itſelf, and forces us to return and walk in that path only which the ground-worker has gravelled.

But the following barrier, which I have invented, and called the INVISIBLE FENCE, is equally unſeen from every point of view. It completely excludes cattle, but can never confine the human ſpecies;—the moſt delicate lady may walk over it in any direction; and, of courſe, all places where it is uſed, will, as to fences, be free and unreſtrained as nature herſelf.

This kind of fence is applicable to any purpoſe, whether ornamental or uſeful: it is equally cheap with the former; and appears to me the beſt unſeen barrier as a ſubſtitute to the ſunk fence.

An excavation is formed eighteen or twenty inches deep, and ſix or eight feet wide; a railing made of larch wood (either a plain rail, or croſſed in the way of wickerwork by the ſmall branches), is placed horizontally above it, on a level with the ſur-

INVISIBLE FENCE Pl. IV

Invented by J. Loudon

Fig. 4. Section

Fig. 5. Sect.

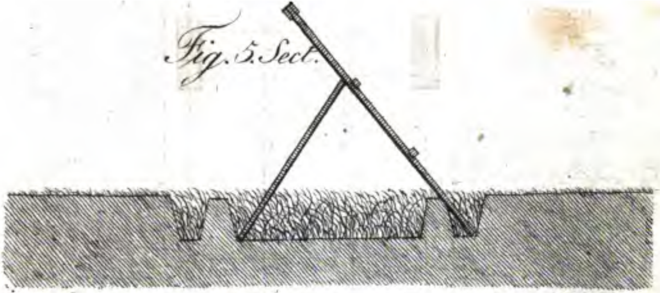


Fig. 6. Horizontal View

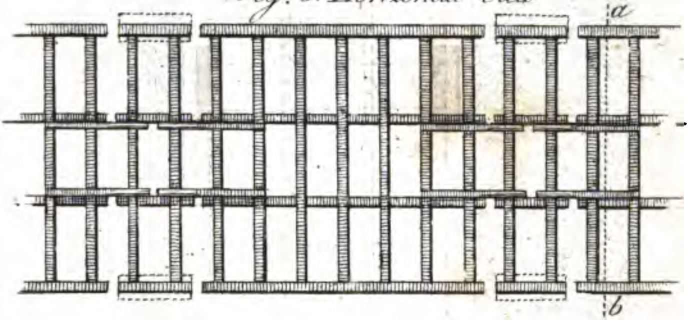
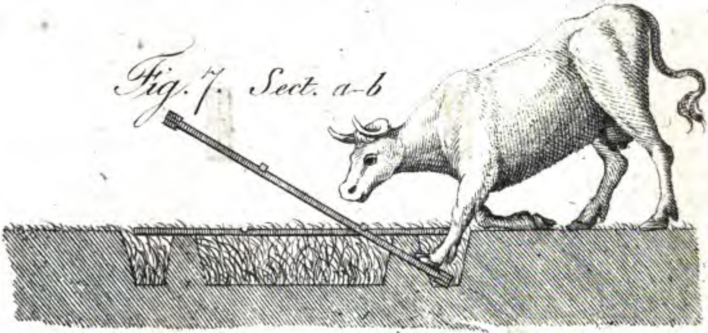


Fig. 7. Sect. a-b



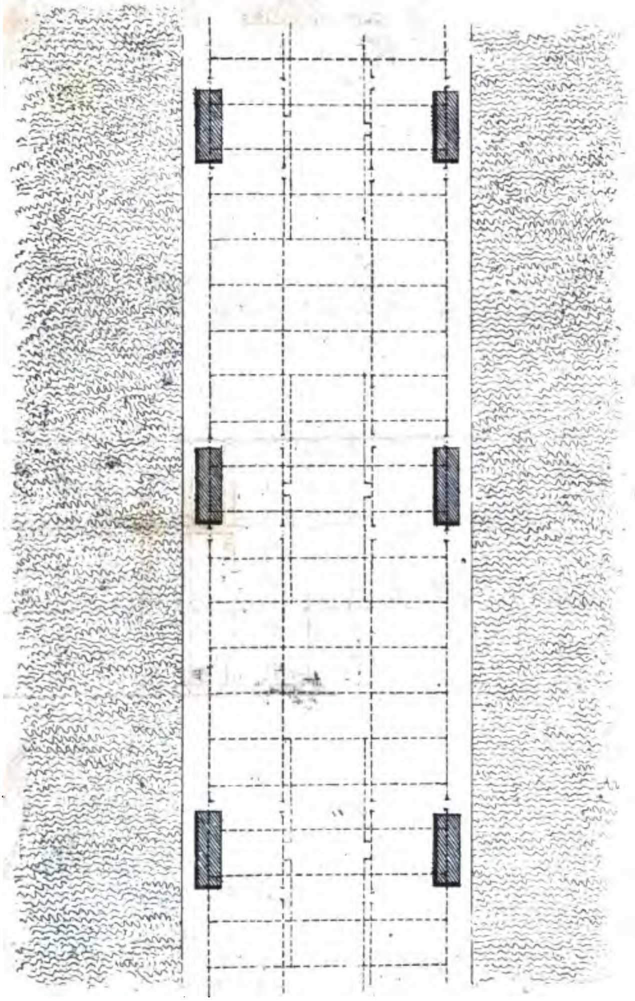
J Loudon Del. F Lamb Sculp

Face P. 153.

Pl. V.

INVISIBLE FENCE

Ground Plan



J. Loudon Del. F. Lamb Sculp

Face Plate IV

rounding ſurface; the bottom of the excavation is ſown with graſs ſeeds, which will grow about as high as the rail, and, covering it, will render the whole inviſible. Should it grow much higher, it can eaſily be topped with the ſcythe. (See a ſection of this fence, Plate IV. ſketch 5.)

It is evident that this will be a ſufficient barrier for ſheep, cattle, &c. while the human ſpecies may walk over it every where at pleaſure. There is but one trifling objection that can be brought againſt it, which ſunk fences are equally liable to, that is, it may be covered with ſnow in winter; but this can be eaſily remedied, by fixing it upright at that ſeaſon (as ſhown ſketch 6.); or it may be compoſed of ſeveral pieces, every one of which may reſt upon croſs ſupports by four pins placed horizontally, as repreſented by *a a a a*, ſketch 7.; and then, whether covered with ſnow or otherwiſe, the weight of cattle, ſhould they tread on it, will weigh it down, and frighten them away, as repreſented ſketch 8. *

Fences, or guards for single trees and small groups, are of various ſorts. Some of the beſt ſhall only be mentioned here.

Where the trees are ſmall, the kind made of wire, already mentioned, is the moſt elegant, and the leaſt viſible.

Where the trees are ſingle, and eight or ten inches diameter, pieces of lath, or bark of trees, may be neatly placed, and tied round cloſe to the ſtem, as ſhown fig. 1. plate VI. The height of the lath or pieces of bark may be more or leſs, according to the cattle to be defended againſt. They will require to be untied, and an additional piece of lath or bark put in every two or three years.

Where

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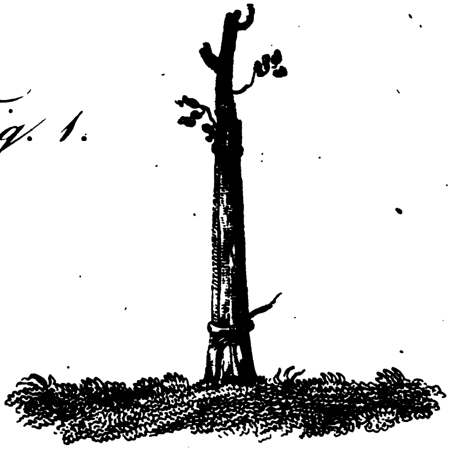
* A more particular deſcription of this fence, with a drawing and model, was ſent by me to the Society of Arts, Strand, London.

PL. VI.

FENCES for SINGLE TREES

Fig. 1.



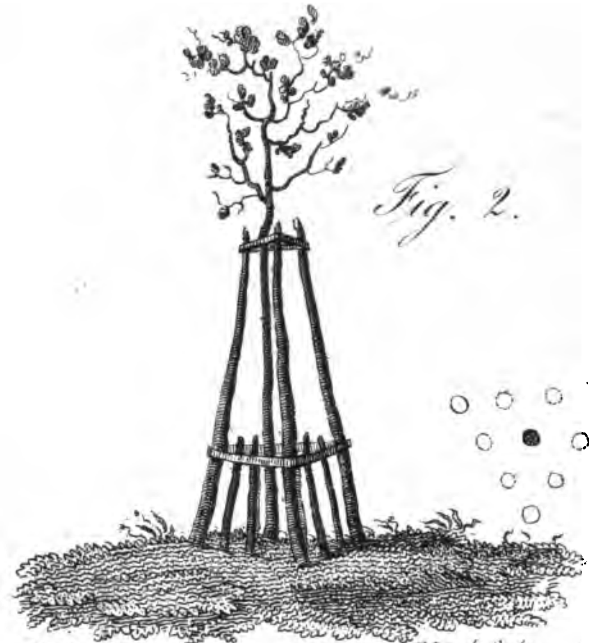


Fig. 2.

J. Loudon Del. F. Lamb Sculp.

Face P. 155.

Where a group of trees, each of which may be of three or four inches diameter, are to be defended from both cattle and ſheep, a couple of rails fixed to poſts, the loweſt three feet from the ſurface, and the other two feet below it, may ſurround the whole; and each particular tree in the group may be defended with lath, bark, or wire, for thirty or forty inches high. This will completely exclude the larger cattle, and admit the ſheep only to paſture in the group.

Were the outer fence painted green, and the inner ones of bark, ſomething near the colour of the trees, and the ſheep paſturing through among their ſtems, it would not be known, at a very ſmall diſtance, that they were fenced at all.

Single trees, or two or three into one hole, may be guarded from cattle and ſheep by the fence ſhown fig. 2. plate VI.

When trees are planted of a very ſmall ſize, the guard ſhould be larger, ſo as that the cattle may not reach over, and crop their tops.

Theſe forms of fences may be combined and varied in many different ways. Hints may be taken from them, and new kinds compoſed, ſuited to every ſituation and circumſtance.

Whatever gives the idea of reſtraint in landſcape, ſhould be carefully avoided; for this reaſon, all fences muſt be managed in a manner analogous to what is called *keeping under* in painting. If they muſt appear, let their colour be ſuch as will not attract the eye: when paint is beſtowed on them, let it be always brown or green, or a mixture of theſe colours with white or red. The *Britiſh inviſible green* is compoſed of both pitch and paint; and it is excellently adapted for coating wood or iron, and preſerving fences from diſtracting the eye in ſcenery.

Where a fence cannot poſſibly be taken

away, it may often be ſo much hidden or broken, as not to offend the eye. This may be accompliſhed by introducing trees or ſhrubs,—or by party colours; ſo that, in ſome places, the rails may appear diſtinct and clear, ſucceeded by parts indiſtinct and hardly viſible. The imaginary extent of ſome places or ſcenes may be greatly increaſed, by making a proper gradation from bright to dull colours in the fences.

SECTION XIV.

OF HEDGE-ROW TIMBER.

ALTHOUGH a few trees growing in a hedgerow, when conſidered ſingly, may have little effect, and be of no great value; yet a number of hedgerows, all properly interſperſed with timber trees, will completely change the appearance of a country, improve its climate, and yield a conſiderable quantity of timber to the proprietors of the lands. The conſideration of this ſubject, then, muſt be of great importance to the landed intereſt and the farmer.

The few hints I ſhall give, will be included under

The *lands where hedgerow timber may be planted*, without injuring the farmer; and

The *ſpecies of tree* moſt proper to be planted.

With reſpect to the *farmer's intereſt*, the lands moſt obviouſly adapted for hedgerow timber, are thoſe which are kept principally under paſturage; and with reſpect to the beauty of a country, the improvement of its climate, and the health of its inhabitants, the riſing grounds alone ſhould be planted; except a few in the vallies, by the ſides of public roads or rivers, to form foregrounds to the reſt of the country; and a few near houſes or villages, to group with them, and enrich their appearance.

Low rich vallies between mountains, that are kept in perpetual aration, ſhould not be planted with hedgerow timber (*ſee* Sect. IV.) But a country wholly level, as many counties in England are, may be planted without doing much injury to the farmer; while, if properly managed, it will vary the country, and improve its climate. In ſuch levels, the hedges ſhould be kept very low, and the trees trained erect, with ſingle ſtems and few lateral branches; or, as is done in ſome places, the width of an ordinary ridge on each ſide of the hedge may be kept in perpetual paſture, which prevents the corn from being ſo much injured by the trees, and is a great ornament to a farm. But if the whole farm is kept in perpetual paſture, the trees may be allowed to extend their branches, and the hedges may be kept high or low, at pleaſure.

Moiſt or clay ſoils, under perpetual aration, ſhould never be planted with hedgerow trees. And, indeed, before they are planted any where, a due eſtimate ſhould be made of their effect on the annual rent of the land—on the value of the eſtate—on the climate—and on the appearance of the country.

The ſpecies of trees which are moſt proper for hedgerows are, in good deep ſoil, the oak and Scotch elm; in ſtony ſoil, the aſh; in poorer ſoil, the beech, ſycamore, and birch; in the caſe of a moiſt ſoil, as meadow, &c. the Lombardy poplar, which, beſides its timber produce, forms, as it were, a cloſe, erect, narrow hedge, ſixty or a hundred feet high, in a few years.

The oak and the Scotch elm proſper better in this ſituation than in any other; their roots have a free range in the adjoining encloſures, while their tops ſhoot out their herculean arms in every direction; and thus, ſtrong, crooked ſhip-timber is rapidly obtained.

The beech is peculiarly adapted for thin ſoils and expoſed ſituations. When planted about ten or twelve feet aſunder, it produces excellent ſhelter, and at the ſame time a very conſiderable quantity of timber.

The aſh and ſycamore will grow erect in the moſt expoſed ſituations. When planted in good ſoil, they ſhould generally be trained to ſingle ſtems; in which ſtate, their timber produce is moſt valuable; that of the aſh, in particular, is becoming very ſcarce, in conſequence of the tree being too much neglected by planters. *

In the cyder counties of England, fruit trees are frequently introduced in the hedgerows and in ornamental groups, and interſperſed among other trees in the park or lawn, and they are highly profitable. In many other counties in England, and in many parts of Scotland, they might be planted with equal, if not ſuperior advantages.

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* See ſome Obſervations by the author on Hedges and Hedgerow Timber, in the Gentleman's Magazine for January 1804.

The reſinous tribe, and the evergreen ſorts of trees, are generally improper for planting in hedgerows.

In many places, where hedgerow timber exiſts, the ſituation is improper, and the management wretched. Hence it has become an injury to the farmer, without yielding any advantage to the proprietor. Two more glaring inſtances of this cannot be given than in the tall, naked elms, and pollard oaks which prevail in many places in the ſouth; the former, by improper pruning, are worth nothing; and the latter, by being cut over at the height of eight or ten feet high, form ugly clump-headed buſhes, which do great injury to the farmer, and yield nothing to the landlord.

In defence of theſe practices, it may be ſaid, that fuel alone is the intended produce; but it would be much the beſt way to allot a ſpace by itſelf for raiſing fuel, and devote the hedgerows for the more important purpoſe of raiſing timber. The fuel plantation could be let at ſo much to the farmer, and the hedgerows would belong excluſively to the proprietor.—Keeping each ſpecies of plantation ſtrictly characteriſtic of its kind, is as beneficial in planting, as the diviſion of labour is in political economy.

There are a great many places in Scotland, and the northern counties of England, where hedgerow timber might be planted, to the great advantage of both landlord and tenant, and the great ornament of the country. Suppoſe an eſtate of two thouſand acres, divided into fields of ten acres each, and the hedgerows planted with trees at fifteen feet apart; this would be upwards of eight trees upon each acre, or ſixteen thouſand trees in the hedges only. At the end of thirty years, they would be worth from twenty-five to forty ſhillings each, ſay only thirty ſhillings each, this is *twenty-four thouſand pounds.* A very conſiderable ſum for a proprietor of only two thouſand acres, to receive every thirty years, over and above the annual rent of his eſtate. The farmer will allow, that the paſture would be worth a higher rent, when thus encloſed and ſheltered, than before; and every traveller would confeſs the good effect of the trees upon the appearance of the country.

SECTION XV.

OF THE MANAGEMENT OF NEGLECTED PLANTATIONS, WITH A VIEW TO RECLAIM THEM.

I APPREHEND that there are few plantations in this iſland which will not come under this Section. Many gentlemen, who are very careful in the firſt formation of plantations, never think of their future management. Some, from erroneous ideas, contend for leaving them afterwards entirely to nature; while others argue, that nothing ſhould be done in the way of thinning or pruning, for a conſiderable number of years after planting,

planting. Neglect of the fences, and a general careleſſneſs, ruin many others; and not a few are wilfully neglected, from an idea that no return will be made for a great many years after planting. Theſe, and many other cauſes have contributed to the neglect of almoſt all the plantations of this iſland, to the incalculable loſs of the proprietors, and the nation in general.

Nor need it appear wonderful that this is the caſe; for there are ſo few examples of well-managed plantations, that gentlemen who plant have no proper examples to imitate; and notwithſtanding the many valuable treatiſes on this ſubject which are already written, and read by many, yet, until the precepts which they contain are exemplified by ſome individuals, no real improvement can be expected in the general plantations of the country. But when here and there a gentleman, previouſly to planting, prepares the ſoil, then inſerts the plants judiciouſly,—encloſes his plantation,—cultivates, trains and thins it with propriety;—when, in conſequence of this, his trees are outgrowing thoſe planted many years before, and yielding more than woods of three times their age—the neighbouring gentlemen take the hint, and adopt the practice—it ſpreads around, and in a ſhort time it is followed throughout the whole country.

This was preciſely the caſe with farming. The moſt approved ſyſtems of agriculture and rural economy, which are followed at the preſent day, were long ſince deſcribed by the ancients, and more recently detailed, in publication after publication, by the moderns; but until a few ſpirited and liberal-minded men ſet the example, and proved, by their ſuperior crops, the advantages of the new ſyſtem, nothing was done. But this being now accompliſhed, good farming is ſpreading wider and wider, and every gentleman, as well as farmer, feels the happy conſequences.

In bringing a neglected plantation under proper management, the firſt thing to be conſidered is, the kind of plantation which ought to have been made there. Whether an open *grove*, thick *wood*, or *copſe* only. It is then to be conſidered by what means it may be reduced to the proper character, or to which character it can moſt eaſily be changed; for caſes will often occur, where the requiſite character muſt not be attempted, but that which is already produced muſt be rendered more characteriſtic.

In proceeding to accompliſh this purpoſe, all plantations will be found to conſiſt of

Hardwood alone;

Reſinous trees alone; or

Hardwood and reſinous trees mixed together.

Hardwood.—If a plantation of hardwood is to be reduced to a *wood* (that is, to timber trees and undergrowth) and the undergrowth is to be uſed for fuel only, then good trees, of kinds ſuited to the ſoil and the probable demand, &c. muſt be pitched upon, and left as ſtandards; while all the reſt are cut over by the ſurface, that they may become ſtools for producing undergrowth. The ground ſhould then be dug, trenched or hoed, according to circumſtances; though, from the crowded ſtate in which the trees may have previouſly been, theſe operations will generally be rendered unneceſſary.

But in place of common undergrowth, ſuppoſe that of oak was deſirable; then, after having fixed upon the proper ſtandards to be retained, all the reſt muſt be grubbed out by the roots, the ground dug or trenched, and acorns planted; and again, when theſe are grown, they muſt be kept free from weeds, for two or three years, to promote their progreſs.

Suppoſe it were deſireable to reduce the whole to *copſewood.* If for fuel only, then cut over the whole by the ſurface; if for bark, root out the whole, reſerving all the oaks, and plant with acorns, &c. as before.

Or if it were deſireable to reduce a neglected plantation of this kind to a *grove*, then the moſt ſuitable trees are to be reſerved at proper diſtances, and the reſt grubbed out by the roots: afterwards, the ground ſhould have the neceſſary degree of cultivation, until the trees can defend themſelves from cattle; when the whole may be ſown with graſs ſeeds.

Reſinous trees.—When an artificial plantation of the fir tribe has remained without thinning for twenty years, the caſe is frequently deſperate: about that age they are generally ſo overpowered with one another, that they ſtop growing; and whenever one is thinned out, all around it die. The beſt way is to grub them all out by the roots, and replant, after the ſoil is properly prepared by ſummer-fallow, or two or three corn crops.

Natural plantations of reſinous trees, under twenty, and artificial ones under ten years old, may moſt commonly be much improved by thinning. In reclaiming plantations of reſinous trees, it is unneceſſary to cultivate the ſoil, as their ſhade deſtroys almoſt every other plant: often, indeed, cultivating the ſoil becomes hurtful to them, as their roots run ſo near the ſurface, that they are liable to be much injured by the operation.

Hardwood and reſinous trees mixed together.—Few artificial plantations are entirely void of reſinous trees. Here I refer to thoſe where the number is ſo great, that they cannot be brought under the management recommended in the firſt head, and at the ſame time not ſufficient to warrant the management recommended for reſinous trees alone. Plantations of this ſort can be reduced to the grove kind only; or, if the reſinous trees are unequally diſtributed, to the grove in ſome places, and the wood in others; the methods of accompliſhing which have been already noticed.

Under each of theſe heads, caſes will frequently occur, where the tree or trees which are moſt profitable in that part of the country are deficient or totally wanting in part, or the whole, of the plantation to be reclaimed. In this caſe, theſe parts may be grubbed up and replanted; or, where the whole is to be grubbed up, it may be divided into parts, half the number of which are to be taken up and replanted, and the other half left alternately to ſhelter them the firſt two or three years: afterwards, thoſe parts left are to be taken up and replanted with young trees alſo, when they will again be ſheltered by thoſe parts firſt planted.

Draining is an improvement applicable to every kind of neglected plantation that ſtands in need of it. When it is omitted, every other operation, however well performed, will in the end prove unſucceſsful. The damage many plantations ſuffer for want of draining, particularly all the Royal foreſts, is incalculable. Many thouſands of acres would, by this operation alone, be rendered of twenty times their preſent value *. As all plantations may be drained by open cuts, the neceſſary expence is very trifling compared with the drainage of arable grounds.

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* See the Reports of the different counties given in to the Board of Agriculture. The Biſhop of Landaff's Obſervations, &c. The moſt glaring inſtance which occurred to me, in the courſe of my practice, was at Schawpark, near Alloa.

It is almoſt unneceſſary to mention, that in reclaiming neglected plantations, the fences are always ſuppoſed to be kept in proper repair, this of itſelf being often the complete ruin of numberleſs acres.

Thinning old or neglected plantations ſhould always be performed gradually, and with a due regard to the age and kinds of the trees, the ſoil, ſituation, and other circumſtances. The margin ſhould generally be left thicker than the inſide; and that place where the ſoil is thin, ſhould not be left ſo thick of trees as where it is deep and good.

Pruning, alſo, ſhould go hand in hand with theſe operations, according to the age and ſize of the plants, the particular ſpecies, and the purpoſe in view.

It becomes a matter of great importance for thoſe who have neglected plantations, to proceed immediately to reclaim them, ere, by delay, it become leſs practicable, or too late. Making young plantations is highly commendable, as it tends to provide for poſterity an indiſpenſably neceſſary and highly uſeful material; which, perhaps, at a future period, may be hard to purchaſe in a foreign land. But reclaiming thoſe which are neglected, or improperly managed, would produce more immediate returns to the proprietor, and ſpare much money to the nation, which is now paid for imported timber.

SECTION XVI.

OF FELLING WOOD.

IN trees, as in men, there are three ſtages, youth, manhood, and old age. In the period of youth, the growth is rapid; in manhood, that growth is matured; and in old age it begins to decay.

The moſt profitable ſeaſon for *felling timber*, is at what may thus be termed the beginning of manhood. After that time, though the tree may appear ſound and healthy, its annual increaſe is ſo little, that it would be more profitable to cut down and replant. The number of years a tree may ſtand, before it arrives at this period, muſt vary in different ſoils and ſituations; but the period itſelf may eaſily be aſcertained—by the annual ſhoots—the ſtate of the bark—and by taking the circumference of the tree at the ſame place for two or three ſucceſſive ſeaſons, and comparing the difference.

In the view of profiting from timber produce, it is of great conſequence to cut down plantations at manhood. * Many trees will ſtand half, others a whole century, after that they are full grown,—appear quite healthy,—and, at the ſame time, make little or no increaſe of timber. But there are particular caſes, ariſing from the nature and ſtate of the markets, where it may even be more profitable

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* 'It ſhould be in the vigour and perfection of trees (which, for the oak, I take to be about the age of fifty, or betwixt that and ſixty years of growth, where the ſoil is natural) that a felling ſhould be celebrated.'—*Hunter's Evelyn's Sylva, p.* 508.

profitable to cut timber before it is arrived at a full growth.

Undergrowth is always *cut* in the ſtage of youth, ſooner or later, according to the kind of tree, and the purpoſe for which it is raiſed.

It may be difficult to ſay when timber, which is principally planted for ornament, ſhould be cut down. A tree, when young and freſh, is beautiful; when middle-aged, it is more or leſs pictureſque; when in old age, ſtrikingly ſo, with a degree of grandeur; and its greateſt height of pictureſqueneſs and ſublimity is in decay. Hence, if ornament (or expreſſion, which is a better term) were the ſole object in view, trees need never be cut down. But moſt men have a liking for beauty; and, though all may be ſtruck with grandeur or ſublimity, few have ſo much enthuſiaſm as to ſacrifice the profit of valuable timber for the pleaſure of enjoying any of theſe characters.

The *modes of felling timber* ought to be different, according to the kind of the plantation.

In deciduous groves, the trees muſt be gradually thinned out as they arrive at maturity: if the grove is to be continued, they ſhould be cut over by the ſurface, and each ſtool encloſed with a fence, that, being defended from cattle, it may produce a new tree. If it is not to be continued, they ſhould be rooted out at once.

Pine or fir groves, or any fir tree whatever that is felled, ſhould be taken out by the roots at once.

In woods, the undergrowth ſhould be cut over within three or four inches of the ſurface, reſerving always a good ſapling to ſucceed any timber tree which may be cut down.

The proper time and manner of felling timber and undergrowth, are of great importance. ' A timbered eſtate ſhould frequently be gone over by ſome perſon of judgment, who, let the price and demand for timber be what they may, ought to mark every tree which wears the appearance of decay. If the demand be briſk, and the price high, he ought to go two ſteps further, and mark not only ſuch as are full grown, but ſuch alſo as are near perfection; for the intereſt of the money, and the diſincumbrance of the neighbouring young timbers, and the comparative advantages of a good market, are not to be bartered for any increaſe of timber which can reaſonably be expected from trees in the laſt ſtage of their growth.

‘ There are men in this kingdom, who, from miſmanagement of their timber, are now loſing, annually, very handſome incomes. The loſs of price which generally follows the refuſal of a high offer, the certain loſs of intereſt, the decay of timber, and the injuries ariſing from the incumbrance of full grown trees, are irretrievable loſſes, which thoſe who have the care and management of timber ſhould ſtudiouſly endeavour to avoid. But while we thus hold out the diſadvantages of ſuffering timber to ſtand until it be overgrown, it is far from our intention to recommend, or even countenance, a premature felling.' *

There are many very judicious obſervations made on this ſubject by the Biſhop of Landaff, in the Introduction to the Report of the County of Weſtmoreland, which merit the particular attention of thoſe who are cultivators of oak timber. 'If profit is conſidered' (his Lordſhip ſays) 'every tree ought to be cut down and ſold, when the annual increaſe in value of the tree by its growth, is leſs than the annual intereſt of the money it would ſell for. This being admitted, we have only to inquire into the annual increaſe in the value of oaks of different

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* Planting and Rural Ornament, vol. II. p. 98.

ent ages.' After various ſtatements, his Lordſhip fixes upon thirty ſhillings each as the price of trees which ſhould be cut down; as, if they be cut before they arrive at that value, or if they be allowed to remain till they will ſell for a much higher price, the proprietor of the ſoil on which they grow will be a loſer. He alſo mentions its being the general opinion 'that it is more profitable to fell oak wood at fifty or ſixty years growth, than to let it ſtand for navy timber to eighty or a hundred, owing to the low price that is now paid for oak trees of large dimenſions, either by the Navy Board or the Eaſt India Company.' For this reaſon, he recommends the making a much greater than ordinary increaſe of price on timber of a large ſcantling, viz. that 'in place of four or five pounds per load, if they would give eight or nine pounds per load for trees containing each one hundred cubic feet and upwards, every man in the kingdom would have a reaſonable motive for letting his timber ſtand till it became of a ſize fit for the uſe of the navy; whereas, according to the preſent eſtabliſhed price, it is every man's intereſt to cut down his trees before they arrive at a proper ſize to be uſeful as navy timber.' This points out, in the ſtrongeſt manner, the neceſſity of attending to the Royal foreſts; for, unleſs this is done, or ſuch a price given for large timber as his Lordſhip mentions, it is evident that oak proper for ſhip-building, which is already very ſcarce, will be completely exhauſted in a very ſhort time. *

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* Modern Agriculture, vol. IV. p. 23.

SECTION XVII.

OF SOME PARTICULAR USES AND PRODUCTS OF TREES.

'ALTHOUGH there are many ſituations in which it is impoſſible to make any profit of the wood of trees in ſubſtance; yet, as many of theſe yield ſome other produce of great value independent of that, it is impoſſible to conceive a ſituation in which profit may not be made of a plantation of trees, as I hope to be able to demonſtrate in the moſt ſatisfactory manner. If the wood is of no value, it is ſtill in his power to extract from it *turpentine*, and its *oil*, *rosin*, *tar*, *pitch*, and *lampblack*, which can eaſily bear the expence of tranſporting. If it is not proper for theſe, t may be reduced to aſhes, and afford that valuable ſubſtance called potaſh. In ſome ſituations, charcoal may be of uſe; and in others, the bark becomes of great value; and ſugar may be extracted in abundance from trees which may yet grow in our moſt barren mountains: nor is it impoſſible but the Caledonian hills may yield from their trees a wine not inferior to thoſe which the grape affords in warmer climates.' *

Here I might add to theſe, ſeveral other valuable products of trees, as birdlime, galls, &c.; but I beg rather to refer for theſe, and the various methods of obtaining them, to Du Hamel's *Traité d'Arbres*. Some of thoſe noticed above, however, are very profitable, and may be obtained from trees which, in this country, are generally cultivated. To them, in a moſt particular manner, I wiſh to call the attention of proprietors of plantations; and as I have not had much experience in this particular myſelf, I ſhall make ſome extracts from Agricola's Obſervations on Timber Trees.

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* Agricola on Timber Trees, p. 134.

Alluding to the roſin and turpentine which may be extracted from the fir tribe, and to the probability that tar alſo may be obtained from theſe as well as from the pine, he ſays, ‘ But, valuable as the wood of the larch may be, it is not on this account alone that the inhabitants of *Italy* prize it ſo much. They likewiſe make uſe of its bark for tanning leather; and from the body of the tree, while growing, they extract that reſinous balſam, commonly known by the name of *Venice turpentine*, which yields them a very conſiderable revenue. The manner of extracting the turpentine is as follows:

‘ The whole of the wood of the *larch* tree is richly impregnated with this reſinous juice, and, when young, it is almoſt equally ly diffuſed through all the parts of it; but, as the tree advances in ſize, there is gradually formed, in the body of the wood, eſpecially near the root of the tree, ſmall cavities, which are filled with this liquid roſin, quite pure, and ſeparate from the wood. As the tree grows bigger, theſe cavities likewiſe increaſe, inſomuch, that when a tree is in full vigour, and of a conſiderable magnitude, theſe will ſometimes be found about an inch in thickneſs, three or four in breadth, and as much in height.

‘ Theſe cavities are chiefly met with about five or ſix inches from the heart of the tree; and it is generally obſerved, that, in the trunk of a tree about forty feet in length, there will be found about ſix or ſeven of theſe principal reſervoirs, and a great number of ſmaller.

‘ When the trees begin to decline, the cavities contract, and afford but little turpentine; for which reaſon, the workmen ſeldom chooſe a tree that is very young, or very old, as neither of theſe would yield much of this balſam; but prefer ſuch trees as are of a conſiderable magnitude, and ſtill in high vigour, before all others.

'To extract this reſinous juice, (if I may ſo term it), they bore a hole into each tree in the month of March, piercing very near to the heart of the tree, and making the hole ſlant a little upwards, to allow the balſam which may be collected in it to flow out more eaſily. To each of theſe they fix a ſmall tube of wood, at the end of which they hang a veſſel for receiving the roſin, as it flows from the tree. They come to the wood every morning, from the end of May till the end of September, to empty the veſſels which are hanging at the tree; the balſam taken from which they carry home, and keep in proper veſſels till the end of the ſeaſon; and when they can obtain no more, they ſtrain the whole through a cloth, and put it in proper veſſels for ſale.

'This is a ſemifluid balſam, which never hardens in the air, and is commonly ſold by the name of Venice turpentine, although it is of an inferior quality to that obtained from the fir tree, which is the only genuine kind. If it is diſtilled with water, it yields an eſſential oil, which is likewiſe called oil of turpentine, although it is alſo of an inferior quality to that obtained from the fir tree.'

'Such is the proceſs for obtaining the turpentine from the larch, the profits ariſing from which muſt be very conſiderable, ſeeing it is generally computed that a vigorous larch tree will yield ſeven or eight pounds of turpentine every year for forty or fifty years.*'

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* 'The uſual ſelling price of this roſin, I am told, is about ſixpence per pound. But ſuppoſing it were only twopence, the annual produce at the above rate would amount to 1s. 4d. or 1s. 6d. per tree. A Scots acre contains 450 trees, at ten feet from one another; at which rate, the annual produce would be 28l. 2s. 6d.'

Agricola afterwards deſcribes the proceſſes for obtaining the true Venice turpentine and Burgundy pitch from the ſilver and ſpruce fir. The profits that would ariſe from the roſin of the ſpruce, at a very low computation, would amount to 75l. Sterling *per* acre *per annum.* The turpentine is obtained from the ſilver fir when 'the tree is about three inches in diameter,' and continues to yield an increaſing quantity, 'till it becomes about a foot in diameter; nor is the tree in the leaſt damaged from having its roſin taken from it.'

'From this peculiarity in the manner of yielding its juice (he obſerves) it would be extremely proper to plant this ſpecies of fir tree along with the larix, in thoſe ſituations where the roſin is a principal object of conſideration; becauſe, as theſe trees yield their roſin when very young, while the larix only affords its balſam at a more advanced age, a conſiderable profit might be drawn from them before the larix was of ſuch a ſize as to yield any turpentine; and when the larix ſhould advance in ſize, and require more room, theſe might be cut out, after they had furniſhed all the turpentine they could yield.

'Thus it appears, that a plantation of theſe two kinds of trees might be made to turn out to good account, even in ſituations where the wood could be of little value; and it is more than probable, that either of theſe kinds of trees would afford tar as well as the pine, although I do not know that ever it has been tried. They likewiſe afford an excellent charcoal.'

Agricola next ſhews how the pine tree may be ſucceſſively made to yield roſin, tar and pitch, lamp-black and charcoal; and concludes with the following ſentence:

'I have never heard that tar has been extracted either from the fir or larix, although, as I have already obſerved, from the reſinous nature of theſe trees, it ſeems probable that both of them might be made to afford it in as great quantities as the pine; nor have I been able to learn, whether any of the different kinds of pines are incapable of being made to yield this ſubſtance in abundance, and, in particular, whether the Scots fir would be proper for this uſe or not.' *

Should it be found true, that tar may be extracted from the fir as well as the pine, it will be of great importance to many individuals who may wiſh to plant, but are doubtful of turning the produce to advantage. Thoſe who have plantations of fir trees, of whatever kinds, ſhould try the experiment, and favour the public with the reſult.

From theſe extracts, I truſt it will appear evident that there is no ſituation where trees will grow, in which, if proper kinds be choſen, they will not turn out to great advantage.

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* Agricola on Timber Trees, p. 160.

CONCLUSION.

HAVING now thrown out thoſe few hints, I beg to refer ſuch of my readers as may wiſh for more information on the ſubject, to the many very good Treatiſes on Planting which are already publiſhed. Something uſeful will be found in every one of them. Some contain minute practical directions for performing the operations of planting; others treat of the various ſoils congenial to the different kinds of trees, and the various modes by which they are propagated; others have embraced the ſubject in a more general way, and treated of both trees and plantations. But it appears to me, (and, I doubt not, it will occur to every one who is in any degree converſant with planters or books on planting), that none have hitherto conſidered wood, in an ornamental point of view, in connexion with the actual formation and management of young plantations; two things ſo intimately connected, that we do not conceive how they can be ſeparated from each other with propriety. For though a tree is the moſt beautiful and the moſt uſeful of inanimate objects, yet, from ignorance of one or other of theſe properties, we daily ſee planters making plantations that hurt the appearance of the country and particular places, or ſuch as will not turn out one half, frequently not one fourth, ſo profitable as they might.

A judicious attention to the preparation of the ſoil previouſly to planting, to the culture of the ſoil, and to training and thinning afterwards, is of more conſequence to the proſperity of the plantation, than moſt men imagine. The progreſs which trees have made under the management of ſome gentlemen who have attended to theſe circumſtances, is hardly credible. But there are very few, indeed, who attend to theſe particulars; and hence few experience that ſucceſs which attends proper planting.

Some prepare the ſoil before planting, and encloſe well; but when this is over, imagine all is done, and pay no attention to training and thinning, though, the more thriving the plantation, the more this operation becomes neceſſary.

Others plant in rough, uncultivated ground, where many of the trees very ſoon die; and the reſt, perhaps ſcarcely alive, remain for a great many years, until at laſt they overcome the natural rubbiſh; and then perhaps ſome attention is paid to thinning and pruning them; or perhaps theſe operations are overdone, and the trees are trained up like ſo many may-poles, or lopped over as pollards.

Trees and undergrowth, in many places, are cut down before they arrive at a proper ſize. On the other hand, many gentlemen having formed miſtaken ideas reſpecting the annual increaſe of timber in full grown trees; ſuffer them to remain until they give evident ſigns of decay; thus loſing both the trees, the intereſt of their value, and the rent of the ſurface which they ſtand upon. Now, it deſerves particularly to be remarked, that under each of theſe ways there is ſomething good, or ſingular, or recommended by ſome author, that makes them paſs for rational management with ſuperficial obſervers.

The whole direction of plantations is too generally ſubmitted to gardeners and foreſters, who, though highly proper in their own place, cannot be expected to have a ſufficiently comprehenſive view of the ſubject. Beſides, theſe men are ſo frequently changed from one place to another, that the one often, unknowingly, undoes or counteracts the labours of his predeceſſor.

This conſideration obliges me to confeſs, that though I have written theſe hints, I am not ſo ſanguine in my expectations of the good which will reſult from them alone; but the following mode, or ſomething ſimilar, it appears to me, ſhould be adopted by noblemen and gentlemen with their eſtates.

Every proprietor who does not completely underſtand the ſubject of planting himſelf, ſhould commit the formation and general management of his plantations to ſome perſon of known abilities, who ſhall give all the leading directions and proper examples reſpecting planting, cultivating, pruning, thinning the trees, and felling and ſelling the timber—inſpect them occaſionally as theſe operations are going on,—and give in a report of the condition of all the plantations and trees on the eſtate, and, when neceſſary, a report of the value of the timber. A perſon thus employed in different parts of the kingdom, would ſoon acquire an accurate idea reſpecting the kind and quantity of wood in the country; by which he could diſcern the moſt economical methods and kinds of trees for each particular place, both in reſpect to the growth of trees and the value of timber. His attention ſhould not be directed merely to the extenſive plantations,—he ſhould examine every hedgerow and ſingle tree; nor ſhould he confine himſelf to the trees that already exiſt, but examine every farm—every hedge—every vacant ſpot, or ſpare corner,—and obſerve whether trees might not be planted in ſome, or all of theſe, with advantage. A place once fully examined by this inſpector, might be managed afterwards with a few viſits every year; and of courſe his ſalary would be but a trifling object.

An eſtate, though there were little more room for wood on it than the hedgerows, would ſoon be greatly heightened in value by a perſon of this kind. And if ſuch a general inſpector of wood were conſidered as eſſential to an eſtate as a ſteward, I am perſuaded it would remove bad planting and bad management, and prove of very great advantage to the landed intereſt and the nation at large.

It may be thought by ſome, that a common ſteward is ſufficient for theſe purpoſes; but this is viewing the ſubject in a manner very ſuperficially. Few ſtewards know much about the value of timber; and ſcarcely any underſtand the formation and management of plantations. If gentlemen were to be guided by their ſtewards in every thing, their eſtates would perhaps coſt them little thought; for all would go on eaſily and apparently very well. But a landed proprietor, alive to his own intereſt, conſiders that there are a number of other things from which he may profit, beſides the mere rent of arable land. He has an eye to the bowels of the earth for minerals; to his lakes for fiſheries;

his rivers or brooks for driving machinery, and to his hedgerows and barren ſpots for valuable plantations, &c. ;—and perhaps he has an idea of adding to the extent of his property, by gaining land from the ſea. There are men who have confined their ſtudies to one or more of theſe ſubjects, each of whom muſt have acquired a far greater knowledge on the branch which he has choſen to follow, than the moſt judicious general obſerver. A wiſe proprietor will liſten to the advice of theſe men; and he will always find that this leads to the true way of rendering his eſtate of the higheſt poſſible value.

OBSERVATIONS

ON

THE THEORY AND PRACTICE OF LANDSCAPE GARDENING.

..........DO THOU, O PRICE! ATTEND,
..........ASSIST,..........AND DIRECT..........

KNIGHT'S POEM.

OBSERVATIONS

ON

THE THEORY AND PRACTICE OF LANDSCAPE GARDENING.

INTRODUCTION.

THE preſent mode of laying out grounds is but of late origin. From the earlieſt ages until this ſyſtem was introduced, every thing ſeems to have been done, in the moſt formal manner, by ſtraight lines. Lately, the change was made to curves and circles, under the plauſible pretext of reſtoring nature. But, however laudable the intention, formality is not yet deſtroyed. Squares, octagons and parallelograms, are only exchanged for circles, ovals and ellipſes. The canal, now no longer ſtraight, is regularly ſerpentine, but with the ſame formality and nakedneſs as before. An eſtate is not now laid out into avenues, ſtraight ridings, and wilderneſs work,—but covered with clumps, belts, and ſerpentine walks. Places in the old ſtyle, croſſed with dark avenues and long rows of trees, have a degree of ſimplicity and grandeur, though mixed with formality; but places in the modern taſte, from an eternal flow of diſtinct curve lines, have an appearance of affectation and ſtudied grace, which always creates diſguſt.

The abſurdities of the old ſtyle, however, were obvious and ſtriking; and thoſe who made the firſt deviations from it, deſerve praiſe for having overcome long eſtabliſhed prejudices, although they may have placed other narrow prejudices in the room of thoſe which they had deſtroyed. *

The firſt reformer in this way was Kent. Kent was originally bred a painter; but, from ſome circumſtance or another, turned his attention to gardening, and became a layer out of grounds. His firſt eſſay in this capacity was Eſher, a ſmall place in Surrey. The beautiful variation of the grounds at this place, with the water and rich diſtant ſcenery, made this an excellent ſubject to work upon; and here Mr Kent boldly deviated from the ſtraight lines of his predeceſſors. That place, as it remains at preſent, although formal and diſtinct, ſhews he had ſome knowledge of deſign and effect; and, conſidering it as the firſt innovation upon old abſurdities, it might have paſſed very well, and Mr Kent might have improved in the courſe of practice. But, what is a moſt convincing proof of his contracted ideas

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* Price.

ideas as a painter, Eſher became a model for all his future works. The novelty * of this place, however, attracted general attention at the time; and every gentleman being eager to have his grounds laid out according to this plan, it is eaſy to account for the rapid progreſs of what is called Engliſh gardening, which has extended itſelf ſo widely in the ſouthern parts of this iſland, as to have vitiated the taſte of many proprietors, and almoſt to have gained an abſolute aſcendancy over natural ſcenery.

But Kent, beſides being a manneriſt in painting, was alſo evidently ignorant of the characters, habits, ſhapes and colours of trees and ſhrubs; without which, no painter, in laying out ground, however good his ideas may be in other reſpects, can produce even the

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* The love of novelty, or the love of art, it muſt always be remembered, are quite different from the love of truth or nature. The former ceaſe to pleaſe after a limited time; the latter pleaſe for ever.

the effect which he intends. For the art of creating real landſcapes depends not only upon the knowledge of the principles of painting, which indeed is the leading principle, but equally alſo upon the knowledge of botany, gardening and architecture, as containing the materials with which to work. With a knowledge of the principle alone, any one may judge of effects after they are produced: but without a knowledge of the materials, no man can produce effects agreeable to the principle,—that is, agreeable to truth,—which is nature, the only ſafe guide in the imitative arts.

The moſt eminent profeſſor that ſucceeded Kent, was Brown. He was originally bred a ground-worker. He had no knowledge of pictures or painting, nor, as appears from his works, any reliſh for natural ſcenery. What firſt brought him into reputation, was a large ſheet of water * which he made

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* The glare of water, and of white-waſhed buildings, always pleaſes the vulgar taſte.

at Stowe, in which, as in all his other works, he has diſplayed the moſt wretched and chineſe-like taſte. Wherever his levelling hand has appeared, adieu to every natural beauty!—ſee every thing give way to one uniform ſyſtem of ſmoothing, levelling and clumping, productive of the moſt tireſome monotony, joined to the moſt diſguſting formality.

Brown, however, from his extenſive practice, carried every thing before him, and completely eſtabliſhed his ſyſtem, which has been held ſacred by his diſciples ever ſince; and to ſhew that it is the moſt prevalent taſte, it is only neceſſary to mention, that Mr Repton, the moſt eminent profeſſor of the preſent day, in his book (publiſhed 1803) declares himſelf a follower of Brown.

Other profeſſors of inferior note, who follow Brown's ſyſtem, I paſs over, to make ſome obſervations on the art itſelf.

All imitative arts ſet out, as it were, in a manner as much diſtinguiſhed from the common appearances of things as poſſible. They are admired for their novelty, and as works of art; and it is not until theſe have loſt their power of pleaſing, that men have recourſe to the purity and ſimplicity of nature, which pleaſes from qualities that never grow out of faſhion. Such has been the caſe with painting and ornamental gardening. Painting now imitates nature. Gardening has made advances to this; but I think it may be ſaid, it is as far diſtant from nature as Chineſe repreſentations are from Italian or Engliſh landſcapes.

Lord Bacon ſays, ‘ that when ages grow to civility and elegance, men come to build ſtately, ſooner than to garden finely, as if gardening were the greater perfection; ’ *

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* Eſſay on Gardens.

alluding to the progreſs of theſe arts both in the Grecian and Roman commonwealths. But it need not appear wonderful that gardening is behind both architecture and painting.

A building can generally be completed in a few years; and, that inſtant, it is in its greateſt perfection. A painting can be finiſhed in a few hours, or at moſt in a few days, and is equally perfect in its kind, the moment it comes from the hands of the painter;—while both the building and the picture remain as models for future artiſts to improve upon or copy after. But in gardening it is totally different.

To lay out and plant an ornamental garden (or a place) is an operation of difficulty, and conſiderable time; and thoſe who have done ſo, ſeldom or never have lived to ſee their labours arrive at maturity, and, of courſe, have no opportunity of correcting errors, or ſupplying deficiencies. That inſtant, too, in which it arrives at maturity, it begins to decay, or change its appearance; ſo that, in this art, it is difficult to profit even from the experience of others.

Beſides theſe, there are many other cauſes which operate againſt gardening, in favour of the other two arts. Gardening is a greater luxury than either fine pictures or fine houſes; the latter of which have been long neceſſary, and very naturally lead to the former. An elegant houſe, well furniſhed, is complete of itſelf, and, as ſuch, exiſts in the poſſeſſion of thouſands who have no place nor opportunity, nor indeed could be at the expence of an ornamental garden.

Mr Price, in his Eſſays on the Picturesque, has ſhown, that if the men who were generally employed to lay out places had been acquainted with the principles of painting, (which apply to the compoſition and arrangement of all viſible objects), they would have found few diſadvantages ariſing from theſe circumſtances: and, it is plain, had this been the caſe, landſcape gardening would, long ere now, have been equally perfect with painting; and undoubtedly its productions would have been much more admired than thoſe of that art.—Mr Price's admirable Eſſays on the Pictureſque, and Mr Knight's moſt excellent poem, *the Landſcape*, point out the diſtinguiſhing errors of the preſent ſyſtem of laying out grounds, and contain the beſt ideas that can be imagined for thoſe who practiſe this art. Modern profeſſors, indeed, have endeavoured, in ſome publications, to confute the reaſoning of theſe gentlemen; but their ineffectual attempts had only the happy effect of rouſing the attention of the landed intereſt to ſee the abſurdity of Brown's whimſical ſyſtem.

I believe that I am the firſt who has ſet out as a landſcape gardener, profeſſing to follow Mr Price's principles. How far I ſhall ſucceed in executing my plans, and introducing more of the picturеſque into improved places, time alone muſt determine.

I muſt obſerve here, however, that I am not ſo much prepoſſeſſed in favour of Mr Price's Eſſays, and Mr Knight's poem, as to imagine that there are no other books which can give information on the ſubject; or that no place has hitherto been well laid out; or, that the picturеſque is to be admitted about the environs of a manſion, to the excluſion of every other ſpecies of beauty. On the contrary, I fully coincide with Mr G. Maſon's *Eſsay on Deſign*, and Shenſtone's *Remarks*;—almoſt entirely with Maſon's *Engliſh Garden*, and R. Le Girardin's *Landſcape* and *Village Memoirs*. I admire the imitation of nature at the Leaſowes *—the creative genius diſplay-at Painſhill †—the correct fancy of the ſcenery

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* Shropſhire.

† Surrey.

ſcenery at Hagley*—the woods of Stoke†—at Wroxton‡—and in the Valley of Badminton§—although I ſee glaring errors at all theſe places.

'Nature's favourite haunts are the ſchool of gardening.' She appears in '*ſublimeſt rudeneſs*' upon the mountains of Scotland and Wales. 'Her *milder train of Graces*' diſperſe themſelves along the banks of rivers, and around the lakes. Her '*majeſtic retirements*' are ſituated on the ſtreams of Dove and Derwent,—in the vale of Hackneſs, ‖ and in the groves of Eaſtwell ¶. She aſſumes on 'Richmond Brow,' or Cowperſhill, ** 'a *gayer* and a *ſofter* dignity,—making every ſprightly work of art ſerve for her embelliſhment.'

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* Worceſterſhire. † Near Briſtol.

‡ Earl of Guilford's. § Duke of Beaufort's.

‖ Near Scarborough. ¶ In Kent.

** In Surrey, where I had the honour of laying out Kingſwoodlodge, a celebrated place, the property of G. Bickerdike Eſq. formerly belonging to Denham the poet.

'But from a general view of our preſent gardens in populous diſtricts, a foreigner might imagine they were calculated for a race of Lilliputians. Are their ſhades in any degree proportionable to common mortals? By the turns of their winding walks, one ſhould take them to be the footſteps of ſome reeling drunkard. Such are the ſymptoms of a ſect of whimſicals, which ſeem to have been continually increaſing under repeated literary perſecutions. The undiſtinguiſhing herd, in a region of elegance, will always be awkwardly imitating, or attempting to excel what they cannot help admiring; whilſt nations that are but partially civilized do little injury to the face of rural nature. Neglect of order, not premeditated deſign, makes Turkiſh gardens irregular. As arts increaſe, they come to be miſapplied to the ſuppoſed decoration of natural ſcenery, till correcter taſte diſcovers a diſplay of art to be there inadmiſſible. Thus, finally reſorting to nature's ſtandard, is a proof of the height of civility.' *

Nature is the great ſchoolmaſter and ſtorehouſe of the landſcape gardener. He ought to look around upon all her works with a penetrating eye, and a capacious mind; compare her various forms with each other; mark their defects and excellences; and, from this wide ſurvey, acquire a correct taſte, and an ample ſupply of ideas ſuited to every caſe that can poſſibly occur in the courſe of his practice.

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* Maſon on Deſign, p. 105.

THE THEORY AND PRACTICE OF LANDSCAPE GARDENING.

This ſubject may be treated under the following heads:

1. The principles of landſcape gardening, which include *utility*,[*] and the general *principles of painting*.

2. The *materials* of landſcape gardening, as *ground*, *wood*, *plants*, *lawn*, *water*, *rocks* and *buildings*.

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[*] Real landſcapes, may be created from the principles of painting, and a knowledge of the materials alone. But a knowledge of *utility* is equally neceſſary for the landſcape gardener or layer out of grounds, who, in all his operations, muſt unite *convenience* with *beauty*.

3. The *ſubjects* of landſcape gardening, ſuch as the *palace*, the *villa*, the *manſion*, the *cottage*, &c. as general ſubjects; and the *flower-garden*, the *ſhrubbery*, the *approach*, &c. as *particular* parts, or ſcenes.

To enter at length on the two firſt heads, would be foreign to the nature of this volume, and is the leſs neceſſary, as there are many excellent obſervations on the ſubject contained in Mr Price's Eſſays, Mr Knight's Poem, Maſon's Eſſay on Deſign, Maſon's Engliſh Garden, Abbé de Liſle's Poem, Whatley's Obſervations, Mr Gilpin's writings, and ſeveral other works.

The nature and uſe of *Character*, and the different *ſubjects* of landſcape gardening, have been leſs touched upon than the other heads by moſt writers. Theſe parts of the ſubject appear to me not well underſtood by practical men; and, as they contain the eſſence of both the theory and practice of the art, I am induced to make the following remarks.

ON CHARACTER.

UNITY of character is the fundamental principle of nature, and of the moſt exquiſite productions of art. In every ſcene where the attention is divided, there is an end to all intereſt: it is like putting ſeveral pictures on the ſame canvas, or diſcordant repreſentations on the ſame theatre.

All the objects in a picture ſhould tend to the particular character, or expreſſion, of that picture. All the parts belonging to a place ſhould have a ſimilar relation to the whole, and, in each part, the objects which enter into its compoſition ſhould agree in expreſſion. Thus will all the ſeparate ſcenes pleaſe of themſelves, and, by their connexion and concord, contribute to the general effect and harmony of the landſcape.

Different characters or effects ſhould not only be preſerved diſtinct; but they ſhould alſo be ſtrongly impreſſed. A man or woman may be very handſome, and at the ſame time little better than a ſtatue;—want of animation or expreſſion is the moſt diſagreeable thing in the human countenance.

In like manner, in ſcenery, there may be an aſſemblage of forms and tints, which, though they do not diſagree, are perfectly inſipid: they may be looked on without raiſing any degree of emotion; and, whenever we ſee a human figure, or a ſcene that does not powerfully ſtrike us at the firſt glance, we may pronounce them featureleſs and void of expreſſion. In vain our eyes wander over ſuch ſcenes or objects in queſt of ſomething to ſatisfy and pleaſe. It belongs to expreſſion alone to fix and detain the eye, arreſt the attention, and captivate the ſoul.

Of all the knowledge neceſſary for a landſcape gardener, or a creator of landſcapes, that of *character* is the moſt important: it is the leading guide which ſhould direct him in every operation in the management of natural or artificial ſcenery. With this knowledge, the ſlighteſt operations will produce the moſt enchanting effects; but, without it, every thing goes on with immenſe labour and difficulty,—conſequently is attended with much unneceſſary expence,—and the reſult, after all, will be incongruity. It is plain, however, that moſt of thoſe who follow the profeſſion of laying out grounds, have no conception of this kind of knowledge;—nor do they need it, according to their ſyſtem: for Mr Brown 'has ſo fixed and determined the forms and lines of clumps, belts, and ſerpentine canals, and has been ſo ſteadily imitated by his followers, that had the improvers been incorporated, their common ſeal, with a clump, a belt, and a piece of made water, would have fully expreſſed the whole of their ſcience, and have ſerved for a model as well as a ſeal.' *

Landſcape gardening profeſſes to heighten characters already more or leſs impreſſed by nature;—to change *natural* characters into others;—to create *original*, *imitative*, and *emblematical* characters.

In proceeding to make ſome remarks on theſe heads, it is neceſſary to obſerve, that there are five natural characters, independent of all others, which are univerſal throughout this globe, and to one or other of which may be referred every other *character*, *scene* or *object* in nature, or the works of art.

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* Price's Eſſays, vol. I. p. 264.

Theſe are, *ſublimity*, *picturesqueness*, *beauty*, *ugliness* and *deformity*.

As this arrangement of the effects of viſible objects will be new to ſome, I ſhall juſt take notice of the principles which produce each of theſe characters.

1. The *ſublime* aſtoniſhes, or ſuſpends the ſenſes. It is founded on principles of awe and terror, which, in viſible objects, are produced principally by greatneſs of dimenſion and obſcurity. Perpendicular rocks of great height—immenſe mountains—deep chaſms—the boundleſs ocean,—are all powerfully ſublime, from greatneſs of dimenſion. The ſublime ariſes from obſcurity, when ' thunders roar, ' and clouds begin

' *To darken all the hill, and smoke to roll.* '

In gardening, it is impoſſible to create this character; but, where it already exiſts, we

may

may often heighten, and always lower its effects.

2. The *beautiful* is a pleaſing quality. It is founded on the principles of repoſe, produced by ſmoothneſs, ſoftneſs, freſhneſs, and gradual variation. A better idea of beauty cannot be given, than that captivating object—the moſt enchanting which the eye of man can poſſibly behold—that which inſtantly preſents itſelf to the imagination when beauty is mentioned—that, in compariſon of which, all other beauty is dull and inſipid—the face of a beautiful young woman.

Beauty, however, is ſeldom or never alone, but is generally more or leſs accompanied with the picturеſque, which is always neceſſary to preſerve it from dulneſs and inſipidity. Even in the faſcinating face of a beautiful woman, where nature (as Mr Price ſays) may be ſaid to have fixed the throne of beauty, we find the line of the noſe and forehead nearly ſtraight, which gives a zeſt to all the other flowing lines of the face: while the eyebrows and the eyelaſhes, by their projecting ſhade over the ſhining ſurface of the eye, and eſpecially the hair, by its roughneſs and intricate concealments, relieve, and give ſpirit to the freſh ſoftneſs, clearneſs, and repoſe of all the reſt.

The beautiful in grounds ought always to be mixed in a ſimilar manner with the picturesque,—as where ſoft, ſmooth, gentle undulations are intercepted and relieved by level places, or hanging ſlopes, (as the flowing lines of the face are ſet off by the right line of the noſe and forehead), and the whole varied with groups of trees, ſhrubs and flowers, which will give intricacy, ſpirit and effect ſimilar to the hair, eyebrows, and eye-laſhes. But when, in place of varied groups,—clumps and patches are ſtuck on a beautiful lawn or park, their formal, compact, lumpiſh appearance, is totally deſtitute of variety and intricacy—they are deformities the moſt hideous that can be imagined—worſe even than large warts or pimples on a beautiful female face.

3. The *picturesque* is another pleaſing quality, founded upon the principle of irritation, which is produced by roughneſs and ſudden variation, joined with irregularity. This is the moſt *general* character in nature. It is often mixed with the others, and particularly with beauty. Almoſt all objects, as they approach to age and decay, are picturesque—all irregular buildings and ground—all rivers, aged animals, &c. The picturesque is mixed with the ſublime, as in a raging ſea; with the beautiful, as in the human countenance; or in moſt ſcenes compoſed of trees and ſmooth lawn, or ſtill water, &c.

'*Ce qui plait sans régle et sans art,*
Sans airs, sans apprêts, sans grimaces,
Sans gêne, et comme par hazard,
Est l'ouvrage charmant des Graces.

'Such is picturеſque beauty—the beauty of preeminence; becauſe it is the beauty of the Graces—becauſe it is animated, and gives motion, character and expreſſion to the phyſiognomy of all objects. This it is which is deſigned by the man of genius, and adored by the man of feeling.' *

4. *Ugliness* may be called a quality that produces inſipidity, or a ſlight degree of diſguſt. It ariſes from a want of form, or an unſhapen, lumpiſh appearance, ſuch as ground which has neither the beauty of ſmoothneſs, freſh verdure, and gradual variation, nor the picturеſqueneſs of bold and ſudden breaks,

and

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* R. L. Girardin.

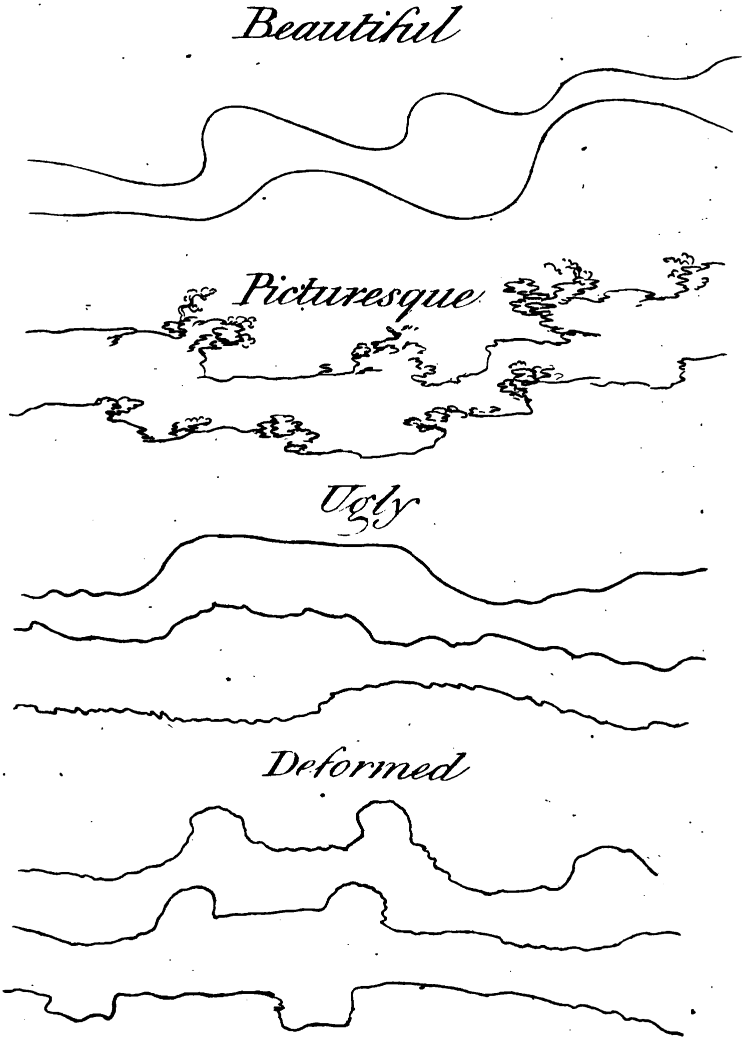
and varied tints of ſoil,—as a rough ploughed field turning to ſward, or what are called pig-backed hills.—Convex ſurfaces of ground are generally more ugly than concave ones.

5. *Deformity*, as oppoſed to beauty, is productive of diſguſt. It is produced by unconnected, miſhapen protuberances, or ſimilar hollows on the ſurface of objects, as naked quarries, or gravel pits, &c. Deformity is to uglineſs, what pictureſqueneſs is to beauty; it heightens its effect: and hence, an ugly object, which is ſimply diſagreeable, when deformed, becomes hideouſly diſguſting.

To illuſtrate theſe two characters, and and their connexion with the three former, let us ſuppoſe 'an artiſt to model, in any ſoft material, a head from the Venus or the Apollo; and then, by way of experiment, to make the noſe longer or ſharper, riſing more ſuddenly towards the middle, or ſtrongly a-

Pl. VII.

OUTLINES OF GROUND



J Loudon Del. F Lamb Sculp.

Face P. 231.

quiline:—Were he to give a ſtriking projection to the eyebrow, or to break the outline of the face into angles—though he would deſtroy beauty, yet he might create character;—and ſomething grand or pictureſque might be produced by ſuch a trial. But let him take the contrary method;—let him clog and fill up all thoſe nicely-marked variations, of whoſe happy union and connexion beauty is the reſult—uglineſs, and that only, muſt be the conſequence. Were he afterwards to place warts or carbuncles on the noſe, or any other unnatural wens and excreſcences on the face; were he to twiſt the mouth, or make the noſe awry, or of an enormous ſize,—he would then add deformity to uglineſs.' *

In all ſcenes or objects that are pleaſing, ſome of theſe three characters will prevail; and, in all others, the two laſt are intermixed in a greater or leſs degree.

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* Price's Eſſays, vol. I. p. 206.

CHARACTERS,

already more or leſs impreſſed by nature, are heightened by *adding* or *taking away*. Places abounding with too much wood, are principally thoſe that can be improved by the latter method: Such as have too little, as is generally the caſe, are thoſe which can be improved by *adding*—in which indeed the great art of improvement conſiſts; for we can ſeldom remove any quantity of the other materials of landſcape. The modes applicable to both caſes will be eaſily underſtood by the following obſervations.

ON HEIGHTENING NATURAL CHARACTERS.

1. Suppoſe a place by nature grand or ſublime. This eſtate is very extenſive. The ſurface of the ground does not conſiſt ſo much of undulations or abruptneſſes, as of

large plains, broad ſwells, and wide vallies. It is bounded, on one ſide, by a range of immenſe mountains; and, on the other, by the ocean.

Every natural feature here being great, the operations of art muſt be great alſo. The principal materials for improving this eſtate, are wood and buildings. Near the centre let a palace or caſtle be built, of large dimenſions, with an extenſive front looking towards the ſea. Plant the wood, not in ſmall groups and ſingle trees, but in maſſy thickets and dark foreſts,—not bounded by a line of inſipid curves, but by bold projections, and deep angular receſſes, forming large bays and prominences, or long ſtraight lines. The predominant trees about this place muſt not be larch, aſh, or willow, but the more noble oak, elm, and pine. While ſome of the mountains, partly bare, ſhew immenſe perpendicular rocks towering almoſt to their ſummits; let others be totally clothed with wood, and, throughout the whole range, as far as may be practicable, let 'hill be united to hill with ſweeping train of foreſt, and prodigality of ſhade.'

To correſpond with theſe general features, every part, as the *lodges*, *approach*, *pleaſure-ground*, *gardens*, &c. &c. muſt have a greatneſs of manner and dimenſion correſponding to the general character of the whole. Thus:

At the extremity of the eſtate, on the ſide of the highway, let two lodges be placed, of a conſiderable ſize, and at a proper diſtance from each other. Let the gate betwixt them be of ample magnitude; and from thence let a broad road or approach proceed, in great irregular ſweeps, ſometimes through foreſt ſcenery, and at other times through open park or paſture, until, at laſt, it begins to aſcend from the valley, and, burſting from a thicket, the caſtle itſelf appears to view in the nobleſt perſpective.

2. Suppoſe a place, the natural character of which is chiefly *beauty*.

This eſtate, not very large, is ſituated on a gentle eminence, ſloping with gentle undulations towards the ſouth. The ſurface in general is ſoft, ſmooth, beautifully waved, and clothed with a carpet of the freſheſt verdure. It is ſurrounded by a country abounding in little hills and lakes;—the former varied by paſture, cattle, corn-fields and villages; and the latter by iſlands and fiſhing-boats.

The natural character of this place, then, is beauty, in the proper ſenſe of the word; that is, beauty with the leaſt mixture of picturesqueneſs. It is to be improved by the addition of wood, to give intricacy; and with beautiful buildings, for character, ornament or utility.

Upon a convenient ſwell, backed by a little hill, build an elegant Grecian villa. Clothe the hill behind it with wood, and vary the park with light and airy groups of aſh, beech and lime, gliding into each other, and connected by thickets covering the eminences and ſwells. Let honeyſuckles and virgins'-bowers twine round the ſtems of the more detached trees, or hang in graceful feſtoons from their branches. Through amongſt them let the paſture be cropt by horſes and cows, and kept ſmooth by the bite of ſheep and lambs. Vary the kept ground with the moſt beautiful ſhrubs and flowers. Lead one of the ſprings in a murmuring rill to a little valley, and there let it ſpread into a cryſtal lake, the banks of which ſhould be beautifully fringed with luxuriant vegetation, and varied with roots, ſtones, and harmonious tints of ſoil.

Every other part of this place muſt be eaſy, graceful and natural, not forced and laboured;—in every operation keeping it ſtrictly in view to form the moſt pleaſing combination of beauty and pictureſqueneſs, wherein beauty ſhall be the prevailing emotion.

3. Suppoſe a place, the natural character of which is the *picturesque*.

This eſtate does not appear of a large ſize. It is ſituated partly in a hollow, and partly on the ſurrounding mountains, which are greatly diverſified in ſhape and appearance. It is interſperſed in many places by rivulets, which run down the ſides of the mountains in hollow dells and dingles to a conſiderable river, which winds with many a crook and turn through the loweſt part of the grounds. From the irregularity of the ſurface, the rocks, ſtones, and diverſity of ſoil, the whole eſtate aſſumes the moſt picturesque appearance, even with the little wood naturally there; and it is eaſy to conceive that this may be made a moſt romantic and ſingularly delightful place, by following out that which nature has begun. But though this eſtate ſhould be covered principally with wood in rough thickets, groups and maſſes, yet the rocks, varied in colour and form, will be ſeen raiſing their heads on the ſides of the wooded hills, and on the banks of the water courſes; and the broken ſurface of the ground will ſhew the different tints of earth, overhung by various wild plants and ferns,—while deer, goats, wild horſes and aſſes, will be ſeen ſauntering in the woods, ſkulking among the thickets and buſhes, or grazing in the winding glades of paſture.

Through one of the wooded dells carry a rough road, winding from ſide to ſide, and croſſing the brook in various ways, and let it aſcend to a plain-looking Gothic manſion. *

Though the general appearance of the whole ſhould be picturesque, yet in the pleaſure-

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* Rather a plain manſion, in order that the eye may find relief from the multiplicity of ſeparate parts which meet it almoſt every where through this place.

pleaſure-ground there ought to be ſcenes decidedly beautiful, as the flower-gardens, &c. There ſhould be a ſmooth lawn round the houſe, and neat kept walks in ſeveral places, that theſe parts, by contraſt with the whole, may ſupport the general character, and give relief and repoſe to the eye.

'In a ſituation of pictureſque beauty, where nature, unconfined, diſplays all her graces, the emotions of pleaſure which we receive from ſight are increaſed by agreeable impreſſions upon the other ſenſes; ſuch as the freſh ſmell of the young graſs;—the opening leaves of the ſpring, expanded by the vivifying electricity of a warm ſhower; —the ſoft murmuring of ſtreams, which give new life to the verdure;—or the tender concert of the birds ſinging among the branches. The hearing and ſmell, leſs quick than the ſight, but alſo leſs roving, and more intimately affected, powerfully aſſiſt in conveying to the heart every delightful ſenſation;

and the more ſolitary the ſcene—the further removed from interruption—the more intereſting will be the effect, and the ſtronger and deeper the impreſſion upon our minds.

‘ Poetry and painting are the offspring of theſe impreſſions. Thoſe who felt ſtrongly, wiſhed to deſcribe what they felt. In ſituations like theſe, paſtoral lays the ſcene of man’s firſt happineſs, and paints, in affecting colours, the true pleaſures of ſimple life. Whenever we meet with any happy ſpot, where art has not yet penetrated, we are delighted to find thoſe ſcenes realized which have given us ſo much pleaſure in the deſcription. All the attributes of ſuch a ſpot, which poetry has rendered ſacred, immediately recur to our memory. Inſcriptions on the bark of ancient oaks;—urns in the wood;—in the conſecrated grove, a ruſtic temple;—in the orchard, under the ſhade of fruit trees, a neat cottage;—groups of cattle feeding in the meadows;—the chorus of the ſhepherds, aſſembled round the living ſpring, while every maid of the village becomes a wood nymph.

‘ Such is poetical landſcape, whether exhibited to our view by nature in ſome favoured ſpot, which has eſcaped the general deſtruction, or created anew by the hand of taſte.

‘ But if picturesque beauty gives pleaſure to the eyes; if a poetical ſcene intereſts, by bringing before us the happy pictures of Arcadia; and if it is in the power of the painter or poet to produce theſe—ſome ſituations there are, which nature only can give, and which I will call the ROMANTIC.

‘ In the midſt of all the great objects and wonderful effects of nature, this ſort of country contains all the beauty of picture, and all the charm of poetry. It is neither ſevere nor groteſque, but peaceful and ſolitary; ſo that nothing divides our attention, or interrupts that calm and delightful ſentiment which penetrates the heart.

‘ Through dark pines and ample theatres of rock, the clear ſtream deſcends by different falls into the quiet vale, and, ſpreading, forms a lake amidſt the ſurrounding cliffs, between whoſe openings ſtupendous mountains are diſcovered in the diſtance, the ſummits of which, covered with eternal ſnows and ice, ſeen from afar, reſemble maſſes of agate and alabaſter—by which all the colours of light are reflected as in a priſm.

The water, of celeſtial blue, and tranſparent as the pureſt cryſtal, ſhows all the ſportive play of the trout, upon its bed of various-coloured marble. An iſland riſes in the midſt of it, the ſcene of rural pleaſures.

‘ Diverſified by vineyards and meadows, and wood of various growth, this delightful ſpot affords a multitude of agreeable receſſes. The cattle crop the leaves of the ſtrawberry, which reddens the banks; and happy couples, whom no intereſted views united, ſit upon the ſoft graſs, ſurrounded by their children. The light of the pale moon ſhews the diſtant undulations of the water. Its glaſſy ſurface is divided by a light bark, which brings the daughters of the neighbouring cottage. A white boddice marks their well-proportioned ſhape; long treſſes float upon their ſhoulders; a little hat of ſtraw, decorated with freſh flowers, makes the only ornament of their ſmiling countenances. Reſplendent with health, and ſerene with innocence, their ſonorous voices are only formed by natural harmony, and they have no teachers but the birds. The echoes, which never knew the jargon of chromatic muſic, repeat only light airs of cheerfulneſs, the voice of nature, or the ſimple ſounds of the hautboy.

'Quitting the lake, the river pierces into a deep and narrow vale. High mountains and frowning rocks ſeem to ſeparate this retreat from the reſt of the univerſe. On their craggy tops, covered with fir, the rude axe was never heard. White goats bound from rock to rock upon beds of thyme and marjoram. Their fearleſs eaſe in this ſequeſtered ſpot gives a ſort of ſecurity to man, and takes off the idea of total ſolitude, by making him expect to find ſome peaceful dwelling not far diſtant.

‘ After ſome rapid falls, occaſioned by the rocks which croſs each other, and oppoſe its paſſage, the river at length finds, in this narrow vale, a ſmall ſpace in which its diſturbed and foaming water dilates, and flows calmly on. The gently riſing ſhore is covered with a wood of riſing oaks, under whoſe myſterious ſhade is ſpread a carpet of fineſt moſs. The clear ſtream, flowing among the twiſted roots, and over beds of various-coloured ſand, invites to bathe. Wholeſome herbs, aromatic plants, and the odoriferous gums of the pine, perfume the air with balſamic vapours, which refreſh the lungs. At the end of this grove of oaks, through an orchard where the trees are loaded with fruit, and interwoven with the vine, appears a cottage. Under the far projecting roof, are arranged all the ſimple utenſils of the family. Planks of fir, put together by the cottager, compoſe the building; a trellis forms the periſtyle and portico, inſtead of architectural columns; and the interior neatneſs ſurpaſſes that of a palace. If the food is not ſeaſoned with the poiſons of the Eaſt, the quality of it is excellent, and the taſte wholeſome and pure. Love diſcovered this retreat, and Happineſs dwells in it.

‘ In ſuch ſituations as theſe, all the force of that analogy is felt which ſubſiſts between phyſical and moral impreſſions. Here the mind wanders with pleaſure, and indulges thoſe fond reveries which become neceſſary to ſuch as are open to ſoft affections, and know the juſt value of things. We wiſh to dwell in theſe ſcenes for ever; for here we feel all the truth and energy of nature.

'This is nearly the ſtyle of romantic ſituations; but very few of this ſort are to be found, except in the boſom of thoſe immenſe ramparts, which ſeem intended by nature as the laſt aſylum of peace and liberty.'*

ON CHANGING NATURAL CHARACTERS.

So much with reſpect to the heightening of natural characters. Thoſe which require to be *changed*, are chiefly ſuch as are productive of diſguſt, as ſcenes of *ugliness* and *deformity*, or in caſes where any of the other natural characters do not agree with that which is to be created.

OF

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* R. L. Gerardin. Viſcount D'Ermeonville's Eſſay on Landſcape, p. 147.

OF CHANGING SUCH CHARACTERS AS ARE PRODUCTIVE OF DISGUST.

1. Suppoſe a place naturally ugly, that is, what the beautiful place formerly mentioned would be, if all thoſe 'nicely marked variations, of whoſe happy union and connexion beauty is the reſult,' were clogged and filled up—the paſture rough—the ſurrounding country naked or moory, and deſtitute of trees and water, &c.

The moſt complete improvement here with the grounds, would be, to reſtore its gentle undulations, and reproduce beauty:—or, if the uglineſs were ſo great as to make this too expenſive—by breaks and abruptneſſes, the character of pictureſqueneſs might be produced, and the place may then be planted and laid out accordingly.

2. Suppoſe a place naturally ugly or deformed; that is, an ugly place covered with unſhapen bumps of earth, or interſperſed with naked quarries and gravel-pits—ſuch a ſubject as this is much eaſier improved than one ſimply ugly, becauſe it is more eaſily reduced to pictureſqueneſs of the moſt intereſting kind, either by breaking the ground, or ſimply planting groups and thickets more or leſs upon and around the bumps and holes; the broken earths and ſtones of which, and the water, &c. in the pits and quarries, would form ſingularly pictureſque ſcenes of themſelves, while they were totally concealed from the general view. Beauty might alſo be produced in ſuch a place as this, by levelling down the bumps, and filling up the quarries and gravel-pits with attention to the proper principles of this character.

It is of great importance to the landſcape gardener to know how to improve uglineſs or deformity; for though a place wholly ugly or deformed may ſeldom occur, yet more or leſs of theſe qualities exiſt almoſt every where, and they may generally be changed into beauties with little trouble or expence. A very few cartfuls of earth will turn a conſiderable extent of the moſt beautiful ſurface into an ugly one, by diſtributing it in the concavities; and, *vice versa*, a very few cartfuls taken from the concavities of an ugly place, and judiciouſſly ſpread upon the eminences or convexities, will reſtore beauty. Ground-workers, who are ignorant of this, never fail, in removing earth, to ſpread it in the hollows; or, if they have no hollows to fill up, nor undulations to round off (as they term it) their next ſtep is to lay it down in heaps here and there, and form theſe into little round bumps, which are the moſt diſguſting kind of deformities. When theſe bumps are *large*, they ſtick on a clump on the top of each; when ſmall, they plant a ſingle tree.

OF CHANGING SUCH NATURAL CHARACTERS AS DO NOT AGREE WITH THAT WHICH IS TO BE CREATED.

BUT there may be caſes, where the grounds are neither ugly nor deformed, and, at the ſame time, the natural character muſt be changed.

Thus, a gentleman may purchaſe a few acres of ground on the ſea-ſhore, and the natural character of this ſituation would be ſublimity. Here he wiſhes to build a houſe; but it would be abſurd to erect one that would have pretenſions to grandeur. An extenſive plain, which is ſurrounded by high mountains, is a ſuitable ſituation for a building of grandeur; but it will frequently happen that no other edifice exiſts there but a farm-houſe.

On the other hand, a wealthy nobleman may wiſh to build a palace or caſtle on grounds that have naturally little grandeur. In ſuch caſes as theſe, the great art is to combine the character to be created with the natural character of the grounds, ſo as the former may become predominant.

Wherever trees will grow, this can generally be accompliſhed with no great difficulty; but, where the ſoil or the ſituation are unfavourable to theſe, the natural character of the ground or ſurrounding ſcenery will be impreſſed upon the building or work of art.

Thus, a cottage on the brink of an immenſe precipice, or a farm-houſe on the margin of the ocean, partake of the ſublimity of theſe ſcenes: * But, even in theſe ſituations,

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* But the ocean and the farm-houſe, or the cottage and the precipice, are far from being ſo powerfully ſublime as an immenſe ruin of a caſtle would be in either of the ſituations.

ſituations, ſhould every other object be ſhut out with trees, and the cottage or farm-houſe viewed by itſelf in this recluſe ſcene, their original characters would be fully preſerved, although, in the general view of the country, the maſs of wood on the precipice containing a cottage, and the thicket by the ſea-ſhore containing a farm-houſe, would naturally, as before, be impreſſed with the character of ſublimity.

But though the ſcenery of nature may confer upon artificial objects a character different from that which they naturally poſſeſs, yet when this is attempted by art, it often produces incongruity, and is ſometimes diſguſting. Thus, an attempt to ornament a cottage, by loading it with architectural decorations, deſtroys its ſimplicity, without raiſing its character. An extenſive palace, upon a knoll little larger than the baſe of the building, appears totally miſplaced; and a ſtable with a fine Doric portico, though at a diſtance it may appear a Grecian temple, yet, when we approach it, and diſcern the deception, it never fails to excite diſguſt.

This, however, does not preclude every idea of character or ornament, nor does it ſuppoſe that the ſtables of a nobleman are to aſſume the ſame appearance as thoſe of his tenants: On the contrary, they may at all times be upon a larger ſcale, and finiſhed with better materials; and this alone will give them a degree of ſolidity and grandeur ſuperior to the others:—or in many ſituations, perhaps, they may aſſume, with propriety, and a good effect, the character of ruins or Gothic buildings.

The principles which produce the leading characters being properly underſtood, the modes of changing them into others, naturally preſents itſelf.

Thus, in a ſmall place, the ground of which is naturally grand, the wood and buildings can be put on in a light and airy manner. In a place naturally beautiful or pictureſque, the wood can be put on in extenſive foreſts, dark thickets, and broad maſſes; the buildings can be made of large dimenſions; and all the other operations of art may ſo correſpond, as to overcome the natural character, and make grandeur or magnificence the prevailing emotion.

Theſe five qualities, *ſublimity*, *pictureſqueneſs*, *beauty*, *uglineſs* and *deformity*, as I have already mentioned, are the grand leading expreſſions that abound throughout all nature. Although often, indeed, they are mixed in ſuch an infinite variety of ways, that in ſome ſcenes it is difficult to ſay which prevails.

This circumſtance, along with ſome others, has given riſe to a number of other characters nearly as general as the former, which the operations of art can alſo heighten or deſtroy. Thus:

A certain degree of ſublimity, accompanied with beauty, conſtitutes what is called *grandeur*; and a degree of picturеſqueneſs, added to this, conſtitutes *magnificence.*—Where moſt of the materials of a ſcene are beautiful, with ſome degree of pictureſqueneſs, as hay-ricks in a ſoft lawn which is grouped with young limes, aſhes and willows, it is called (by the French at leaſt *) a *ſoft* ſcene.

Another degree of pictureſqueneſs and beauty, as a rocky or ſtony ſcene upon a mountain, the top of which is perpetually covered with ſnow, is called a *ſevere* ſcene. One where the parts are few, as a cottage in the corner of a field, with few appendages or accompaniments, is called a *ſimple* ſcene; and ſo there are a great many others, as *cheerful*, *tranquil*, *ſolitary*, *wild*, *peaceful*, *verdant*, *rural*, *ruſtic*, *romantic*, &c.

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* R. L. Gerardin.

There are alſo characters created by art, which may be intermingled with the former. Thus, a manſion may be placed in a *peaceful*, a *verdant*, or a *romantic* ſcene; and this manſion may be either a winter—or ſummer—or a principal reſidence, and aſſume the appearance of a palace, a caſtle, a cottage, &c.

According to the nature and purpoſe of the manſion, the reſt of the place muſt be laid out. Thus:

In a principal reſidence, there ſhould be ſcenes ſuited for every ſeaſon of the year. In the pleaſure-ground, there ſhould be winter, ſpring, ſummer, and autumn gardens; and, throughout the reſt of the place, as many pleaſing ſcenes ſhould be introduced as can be done conſiſtently with its extent, &c.

In a ſummer reſidence, thoſe ſcenes which are in perfection in the winter or ſpring months are rendered neceſſary; but the others muſt be more abundant, and characteriſtic of the ſeaſon.

LET any one contraſt the foregoing obſervations with the practice of modern landſcape gardeners. Whatever be the nature of the place to be improved, their operations are uniformly the ſame. The *ground*, in all the places mentioned, would without any diſtinction be cleared, levelled, and reduced to one uniform flow of ſurface,—faſhioned

> ——‘ *all to one unvaried round,*
> *One even round that ever gently flows.*’

In a word, ſuch a heavy, featureleſs ſurface, as would be denominated ugly by any eye of the leaſt natural taſte.

The *water*, too, would be diveſted of every picturesque circumſtance. The ſides of the dells, the banks of the rivers or lakes, would be deprived of every tree and buſh—

levelled down and reduced to uniform, diſtinct ſerpentine ſweeps, until they were brought as near to the appearance of a made canal as poſſible: and if any canal or pond was to be made from any ſpring or rill, it would be placed in the moſt conſpicuous ſituation, formal, naked and glaring, like a long white ſheet of linen extended on a bleaching green.

The ſavage grandeur of the *rocks* would be tamed—the moſt prominent abruptneſſes or antiquated moſſy ſpots would be pared off. If any buſhes or roots hung over, they would be cut down; and afterwards, any intricate receſs that might remain, would be patched up with ſtones or turf, and all around would be made ſmooth and even. *

The *wood*, alſo, would be put on in a ſimilar manner in each of the places. To mark the property, and ſhut out the adjoining eſtate, a belt would form a boundary to the whole. Within this, the park would be ſpotted over with clumps, and dotted with ſingle trees. Around, or on each ſide the manſion, the pleaſure-ground would be made—the boundary a ſunk fence—its contents, circular and oval patches of all ſorts of ſhrubs—and, through among theſe, a deep-ſunk ſerpentine gravel walk would lead you to the riding in this belt, where you muſt walk once round to ſee the temples and viſtas, and then you have done.

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* This I actually ſaw done in Perthſhire two years ago. See alſo an inſtance in Price's Eſſays, vol. II. p. 228.

From theſe operations, it is eaſy to ſee there can be no beautiful combinations, nor any marked expreſſions about ſuch improved places. All of them, whatever be their natural character, are brought as near as poſſible to the ſtandard which paſſes under the name of *Engliſh gardening*.

OF ORIGINAL, IMITATIVE, AND EMBLEMATICAL CHARACTERS.

THESE apply more to particular ſcenes or objects, than to whole eſtates or places.

The ORIGINAL are ſuch as do not exiſt in nature, but which are deſigned by art, as *gardens*, *ſhrubberies*, *edifices*, &c.

The IMITATIVE include ſuch as are copied from nature, as *water*, *lawn*, *dells*, *rocks*, &c.

The EMBLEMATICAL compriſe ſuch as, from *ſtatues*, *urns* or *inſcriptions*, allude to ſome well known ſubject in hiſtory or poetry.

GARDENS

may be divided into two kinds, ORNAMENTAL and USEFUL.

In *ornamental* gardens of every kind, the ſoil and ſituation ſhould be good, and the ſurface of the ground beautifully varied. Their extent muſt be in proportion to the place they belong to. In general, they need not be large. In almoſt every kind, a few trees and ſhrubs ſhould be introduced, to remove from the general view the appearance of inſipidity, and to break it into ſeparate ſcenes, one of which alone ſhould be ſeen at a time, that the eye in going along may be induced to examine or admire the minute beauties of ſingle objects.

It may be neceſſary to obſerve here, that in ornamental gardens, ſhrubberies, green-

houſes,

houſes, groups of flowers, &c. the ſame principles of arrangement that we find in natural foreſts ſhould (in my opinion) be carefully followed; one kind being always made to prevail in one place, (as mentioned in Section IV. of the Obſervations on Planting.) The grouping—the harmony of forms—of tints, &c. ſhould be attended to exactly in the ſame manner. The whole flower-garden or greenhouſe ſhould be arranged as near as poſſible to a *ſyſtema naturæ*—all the ſpecies of a genus connected together, not in a formal, diſtinct manner, but with a careleſs, natural appearance:—the extreme ſpecies of one genus gliding inſenſibly into thoſe of the next, and theſe again partially intermingled with the ſucceeding, ſo that connexion and harmony may abound throughout the whole.

It is almoſt impoſſible to conceive the variety and intereſt that would be created by this mode of arrangement. If adopted even in the ſmall extent of a greenhouſe, it would render this ſcene as ſuperior to its preſent appearance, as a beautiful picture is ſuperior to a piece of canvaſs ſpotted at random with all the colours of the palette.

I may notice here, too, that thoſe diſguſting lines of ſeparation at the edges of walks, and around groups and dug patches of flowers or ſhrubs, which abound ſo much every where, ſhould be done away; the gravel of the walk, and the earth of the dug patches or groups ought to be kept on a level with the graſs on the lawn; and both ſhould blend and harmonize, and, in a natural, eaſy manner, glide inſenſibly into each other. *

Flower-gardens may either be *general*, adapted to every ſeaſon of the year, or adapted to *particular* ſeaſons only.

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* See ſome Obſervations of mine, on laying out the public ſquares of London, in the Literary Journal for January 1804.

1. A *general* flower-garden ſhould contain ſuch a variety of trees, ſhrubs, flowers, &c. as that a number of each will be in perfection every month of the year, particularly in the ſummer ſeaſon. They ſhould be placed in irregular groups and thickets, of different ſizes, gliding into one another on ſmooth lawn, beautifully varied, and broken into ſmall, confined ſcenes, by trees and ſhrubs of the moſt elegant ſorts. Throughout the whole, ſmooth gravel walks ſhould wind in a graceful, eaſy manner.

In ſuch a garden, the greenhouſe and ſtoves for exotic plants and trees may be placed. In ſummer, thoſe that are reared in the greenhouſe may be diſperſed throughout the garden; and the pots being ſunk in the earth, the plants will appear as natives;* or they may be arranged in a ſituation by themſelves, and retain their own character; and, during this ſeaſon, the houſe may be filled ſilled with balſams, coxcombs, amaranths, and other tender annuals.

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* As at Lord Harcourt's.

In this garden, a few elegant ſeats, both covered and uncovered, may be introduced; but no grottoes, urns, buſts nor temples,* which have all their proper places in ornamental ſcenery, but which are too romantic, melancholy or magnificent, for the beauty and repoſe of this ſcene.

2. *A winter garden* ſhould contain ſuch trees, ſhrubs, plants, &c. as are in perfection, or retain their verdure during this ſeaſon, ſuch as moſt of the evergreen tribe; and ſeveral flowering plants, as aconite, chriſtmas-roſe, &c. They ſhould be grouped and arranged in a natural manner, and a dry gravel walk ſhould be conducted throughout the whole. This garden ſhould be placed near the manſion, in order that it may be conveniently and comfortably approached in

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* As at Lord Harcourt's.

the winter months: and in it alſo the conſervatory ſhould be placed.

3. *A ſpring garden* ſhould contain all thoſe deciduous ſhrubs and trees that bloſſom or put forth leaves the moſt early in the ſpring, ſuch as the almond, mezerion, fringe tree, &c. &c. All the early-blowing flowers, both of the bulbous and fibrous-rooted kinds, as the narciſſus, crocus, iris, cowſlip, auricula, hepatica, &c. The walks ſhould be of gravel, and little or no lawn ſhould appear.

This garden may contain a houſe for heaths, auriculas, and ſuch early-flowering plants. It ſhould be placed near the former one, and connected with it and the manſion by a comfortable gravel walk, that they may be approached at any ſeaſon. The ſoils of both ſhould be light and dry, the ſituations well expoſed to the ſun, and ſheltered from the northern blaſt.

4. *An autumn garden* ſhould contain ſuch a collection of ornamental plants and trees as are in perfection at this ſeaſon;—ſuch as moſt annual flowers when late ſown; many herbaceous plants, as aſter, *ſolidago*, &c.; and ſeveral trees and ſhrubs that continue long in perfection, as the honeyſuckle, roſe, acacia, &c.

5. *A garden of bulbous roots*, in form and deſign, may be ſomewhat different from any of the above. The general form ought to be regular. It may be a ſquare, a circle, or oval, divided into compartments, and each of theſe laid out into beds of three or four feet broad. Here may be grown the different varieties of tulips, hyacinths, ranunculuſes, anemones, &c. each in their proper ſoil, &c.* It may contain a ſtove for the *Ixias Amaryllis*, and ſuch like exotic bulbs.

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* See Maddox's Directions. Hill's Eden, &c.

7. *Gardens* may alſo be made ſolely for the purpoſe of cultivating any ſingle family, genus, or ſpecies of plant or ſhrub, as a garden of *roses*—of *annual flowers*—of *pinks* and *carnations*—of *double flowering plants and trees*—of *variegated kinds only*, &c. :— or of *ferns*—of *grasses*—or of *the vegetables, natives of any particular country*, as thoſe of *America*, *Siberia*, *the Alps*, &c.

8. *A botanic garden* may contain a large collection of all, or ſeveral of the different families of vegetables, arranged either by the ſexual or the natural ſyſtems of Linnæus, or by the natural ſyſtem of Juſſieu, or any other author.

9. *An ancient British flower-garden* may be laid out with ſtraight lines and wilderneſs work. See James's Gardening, Le Meagre's Book of Deſigns, &c. Switzer.

10. *Modern British flower-gardens* are of two kinds; 1. Thoſe laid out into beds fringed on the edge with box, pink, or gentian, &c. as at Blenheim *, Raith †, and moſt places; or, 2. Thoſe laid out into patches and clumps and lawn, as at Nuneham ‡, Eglinton §, Callean Caſtle, &c.

11. *A Chineſe garden.* See Chalmers' Oriental Deſigns.

12. *A Grecian garden.* See Moor's Letters, Elian's Various Hiſtory, Athenæus, &c.

13. *Roman and Italian gardens.* See Cato *De Re Rustica*, Virgil, Pliny's Epiſtles, &c.

14. *A Dutch garden.* See Juſtice, James, &c.

15.

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* Oxfordſhire. † Fifeſhire.
‡ Oxfordſhire. § Ayrſhire.

15. *French gardens.* See Quintinius, Le Notre, &c.

Theſe ſcenes are not only pleaſing of themſelves, but, when introduced in a pleaſure ground, by their contraſt with other ſcenes, and with one another, they add greatly to the variety of that ſpecies of ornamental ſcenery.

THE KITCHEN GARDEN,

though more a ſcene of convenience than ornament, may be mentioned here in a general way. It ought to be ſituated at a convenient diſtance from the manſion, commonly adjoining to the ſtable offices. The ſoil ought to be good, deep, and ſomewhat moiſt. The expoſure ſhould be to the ſouth, and the whole ſhould be well ſheltered all around by wood, placed at ſuch a diſtance as not to ſhade any part from the ſun.

The walls of kitchen gardens are generally made ſtraight; but, in England, ſome are made ſerpentine, which, as it allows them to be made very thin, is a ſaving in the article of brick, and gives a greater ſurface of wall on a given length, for a given ſum. In ſome expoſed ſituations where theſe walls are uſed, the trees ſuffer more from the wind than in the common kinds;* but in all ſheltered ſpots they ſeem to anſwer very well.

The common ſtyle of walks in a kitchen garden I do not object to; only, their edgings, in place of being made of ornamental plants or box, ſhould be made of ſtrawberries, hyſop, ſage, parſley, or any plant that will be really uſeful. Box, I think, ought to be uſed only in nurſery gardens, and edgings of flowers only in parterres, or ſome kinds of flower-gardens.

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* As at Dunkeld.

Dwarf ſtandards trained in the ſame manner as gooſeberry buſhes, I think better than eſpaliers. In the quarters, tall ſtandards may be planted, which have a good effect in magnifying the apparent extent, in ſoftening the wind, and ſheltering the garden. No plant, tree or ſhrub of any kind, which are planted principally for ornament, ought to be admitted on any pretext. Every thing ornamental is foreign to the character of a kitchen garden; and not only proves cumberſome, and adds to the expence of cultivating it, but diſtracts the eye, and injures the general effect.

Here, the pinery, vinery, and all the fruit and forcing houſes, hotbeds, &c. ſhould be placed; but not the greenhouſe or plant-ſtoves, or any hot-houſe intended principally for rearing ornamental productions. It would be foreign to the nature of theſe remarks to deſcribe any of the improvements which I have contrived for hothouſes; ſuch as a new mode of conſtructing the furnaces, and conducting the flues, by which one third, and often three fourths of the fuel commonly uſed is ſaved. Alſo a new and very economical mode of ſteaming hothouſes (without boilers or any expenſive article) by means of a ſmall portable machine; and alſo an entire new mode of ventilation during the winter and ſpring months, from which ſeveral important advantages are derived. Theſe, with ſeveral other improvements on hothouſes, I mean to take an opportunity of communicating to the public in a ſeparate work.

THE ORCHARD

may either be adjoining the garden, or at ſome diſtance from it. After the trees are grown up, it has the beſt effect when under paſture. In moſt places, fruit-trees of different kinds may be advantageouſly introduced throughout the general plantations, or in groups or thickets in the park or pleaſure-ground. By adopting this method, the profits from the fruit produced would be very conſiderable in moſt ſituations.

EDIFICES.

THOUGH a landſcape compoſed of little more than wood and lawn, may be perfectly natural; yet there is a degree of monotony in the continual repetition of ſuch ſcenery. But nature has provided two other materials, *water* and *rocks*; and art has added a third, *edifices*, which relieve and give ſpirit to the ſameneſs of mere earth and vegetation. Water is a brilliant and captivating object, which inſtantly attracts the eye. Houſes, rocks, roads, and even broken ground, are objects on which it may repoſe itſelf; and ſpires, towers and temples are, perhaps, next to trees, the nobleſt ornaments of a country. Edifices of every kind have a powerful and ſtriking effect upon the eye; and the 'great point, not merely in improvements, but in all things that are deſigned to affect the imagination, is to mix, according to circumſtances, what is ſtriking with what is ſimply pleaſing.'

In landſcape gardening, the moſt important conſideration is to accommodate the building or edifice to the character of the ſcene to which it belongs, ſo as it may heighten the effect, and give additional force and expreſſion to this particular character. 'It is a common caſe with garden buildings to be ſtrangely incoherent in themſelves, and unconnected with the places they occupy.

Such are roothouſes in roſaries, hermitages, and cottages ‘ richly ornamented, and thoſe ruſtic ſeats which are marked with a formal vulgarity by way of rudeneſs. ’ *

MR PRICE's *Obſervations on Architecture, Buildings, Statues, Old Gardens, Terraces, Urns, Fountains*, and other ſuch *Decorations* near the houſe, are in my opinion ſo excellent, that I cannot do better than refer my reader to them. For my own part, I ſhall ever eſteem myſelf ſingularly happy (however oppoſed I may be by ‘ the common herd of improvers ’) in profeſſing myſelf his profound admirer and diſciple.

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* Maſon's Eſſay, p. 93.

WALKS AND ROADS.

The formal, ſtiff, and harſh edges of made walks, is one of the moſt ſtriking deformities in garden ſcenery. Though every other part of the ſcene ſhould be perfect,—or though they lead through a natural copſe or an unfrequented dell,—their kept edges and formal manner powerfully diſtract the ſcenery. Indeed, the wilder or more natural the ſcene which the walk paſſes through, the more anxious is the gardener to ſhew his labours, either by the frequent addition of freſh gravel, when moſſes, weatherſtains, or any ſuch picturesque appendages begin to appear; or with the ſcythe and paring irons diveſting their edges of the intricacy which vegetation, during a ſlight relief from his operations, has a continual tendency to produce.

Walks and roads ſhould always be accommodated to the ſcenery which they paſs through. In ſmooth kept lawn, the breadth ſhould be nearly uniform throughout—the direction natural;

'*The milkmaid's careless step has through*
yon pasture green,
Impressed a kindred curve; the scudding hare
Draws to her dew-sprent seat, o'er thymy
heaths,
A path as gently waving.'—MASON.

The edges ſhould blend with the lawn on each ſide, ſo as exactly to correſpond, in appearance, with a foot-path acroſs a field of cloſe-biten paſture.

In wilder ſcenery, or even where a few trees or buſhes are looſely ſcattered over a lawn, the ſweeps or turns of the walk ſhould be more abrupt, and its breadth may vary in a conſiderable degree. A group of ſhrubs, or a ſingle tree, may ſometimes break it in two, where the breadth muſt be divided, and, each narrow courſe taking nearly the ſame direction, in a ſhort time they may meet in one track, and aſſume the former breadth. Some beautiful examples of this kind of walk we find in woody banks or commons.

In thickets or woods, whether of natural trees and undergrowth, or of exotics, as in the ſhrubbery, the edge of the walk ſhould be totally annihilated on both ſides, and bounded only by the irregularity of the loweſt growths. Such walks as theſe were once made by Mr Shenſtone at the Leaſowes, where they were admired by every man of taſte; but they were too ſimple, (although infinitely more rich and varied than trim garden walks), and did not contain a ſufficient diſplay of art to be imitated by groundworkers, who judge of every thing by parts, and with reference to the mere mechaniſm of their art.

WATER.

THIS very pleaſing attribute may be in ſeveral forms, all of which are highly intereſting: as in thoſe of a *river*, *rill*, *lake*, *pool*, *ſpring*, *fountain*, *cataract*, *gentle fall*, &c.

Excellent examples of all of which kinds, with their appropriate ſcenery, are to be found in nature; and Mr Price has ſhewn, in the fulleſt manner, how eaſily theſe may be imitated by art.

The nakedneſs and formality of Engliſh-made waters is diſguſting and unnatural in the laſt degree. See Mr Knight's Poem.

DELLS.

A HOLLOW winding *dell* or *dingle*, containing a burn or rill ſhaded with wood, and its banks diverſified by various coloured earths, roots and ſtones,—or, in dells of a grander character, by bold, perpendicular or projecting rocks, overhung with huge trees, buſhes, ferns and creepers, grouped and combined in an infinite diverſity of ways,—the ſtream interrupted by the rocks, forming roaring cataracts, foaming caſcades, or gentle falls,—and in ſome places where the dell widens into a valley, ſpreading itſelf into a lake, all varied and heightened by the uſual appendages, make what I conſider to be among the moſt enchanting kinds of natural ſcenery.

When a place is fortunate enough to have ſuch a romantic chain of ſcenery as this, it ſhould ſeldom or never be touched by the hand of art. It may happen that ſome improvement may be made, by ſhewing, in a partial manner, rocks, roots or ſtones, that are perhaps totally concealed, by augmenting a natural caſcade, or by ſupplying ivy, or ſome other creepers or evergreens, &c.; but little more can be attempted with propriety.

The principal operation that in any caſe can fall to be done in ſuch a ſcene, is where it may be requiſite to lead through a walk, road or approach, either to obſerve its beauties, or lead to ſome other part of the place. The difficulty of executing either of theſe will be great to thoſe who think of nothing but undulating ſweeps, ſhaven lawns, and ſerpentine gravel walks; but by thoſe accuſtomed to admire this kind of ſcenery, the operation will eaſily be accompliſhed.*

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* Mr Morris's roads and walks at Piercefield are a ſtriking proof of this.

Many dells of the moſt exquiſite kind occur in Scotland and Wales. At ——— in ————, one of the fineſt ſort was treated lately in the moſt barbarous manner. The approach to the houſe was with great propriety led through this ſcene; but, in place of a natural-like road, the moſt formal, high-finiſhed gravel walk that can be imagined was carried ſtiffly along its banks, while all the wood was thinned—all the undergrowth, creepers, ferns, &c. were cut down, and every inequality of ſurface taken away. Even ſome noble perpendicular rocks, overhung with large trees and their edges, varied by roots, buſhes, and other intricate concealments, were totally bared, and the line of ſeparation every where defined by a cut edge of turf-work, upon the top and ſides, exactly ſimilar to that of the gravel walk: all the old ſurface of the rocks, which were beautifully varied by moſſes, weatherſtains and plants ſpringing from their crevices, was hewn off. This freſh, even ſurface, deſtroyed all the intricate concealments, and every circumſtance correſponding with the ſituation; while the ground in front of it, and all around, was neatly laid with turf, and made ſmooth and even. Thus, the grandeur and picturesqueneſs of theſe rocks were totally deſtroyed, and the whole maſs made little better, in appearance, than an upright bank of red-coloured earth.

The ſtream, too, which runs in this dell, was deprived of almoſt every beauty, particularly that of intricacy and ſhade, by reducing its edges to regular curves, and ſloping the banks; and in places intended to be moſt ſeen, it was turfed neatly down to the brink of the water.

'*Shaven to the brink our brooks are taught*
to flow,
Where no obtruding forms or rushes grow.'
KNIGHT.

Every thing being ſmoothed and levelled, and the approach cut out and covered with red aſhes, ſtill more glaring than gravel, tender ſhrubs, larches and flowers, were planted in clumps and patches, where the natural growths had been juſt rooted up, and (childlike) a number of fantaſtic-looking ſtones, which happened not to be far diſtant, were brought and regularly diſtributed (for to group them was a thing they had no idea of) in the moſt conſpicuous places along the road, and particularly along three bridges, by way of parapet. It deſerves to be remarked, however, on the other hand, that theſe bridges, were it not for this circumſtance, are very well executed, and, in ſtyle, are properly adapted for this kind of ſcenery.

This dell, at preſent, has an appearance which may give a fertile imagination ſome idea of what it has once been; but, had any lover of nature ſeen it previouſly to the commencement of theſe operations, about five years ago, it would fill him with the deepeſt regret to ſee it to-day,

'*Freſh from the improver's deſolating hand.*'
KNIGHT.

The flower-garden, and almoſt every other operation of art at ———, in which ornament is the principal conſideration, is equally unnatural and out of character. Mr ———, in my humble opinion, has thrown away a great deal of money in counteracting nature, and literally deforming his place. And as all this is finiſhed from the plan and directions * of a very generally employed landſcape gardener of the preſent day, Mr ———, for whom (though I uſe this freedom with his works) I have the higheſt regard. It fully coincides with all which I have written reſpecting modern Engliſh gardening and its profeſſors.

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* Some improvers, when employed to give their opinion reſpecting the mode of laying out any place in connexion with a general plan, give their ideas more fully in writing, illuſtrated by drawings. This manuſcript Mr Repton calls a *Red Book.* I have adopted a ſimilar practice; only, I have ſtyled my red books *Reports* or *Treatiſes* on the improvements propoſed for any eſtate.

THE SHRUBBERY.

'*Curs'd be the shrubbery's insipid scenes.*'

This line, and thoſe which follow in Mr Knight's poem, I apply to all modern ſhrubberies.

But if the arrangement and grouping of the trees, ſhrubs and flowers, were ſuch as I propoſe (See Sect. IV. on Planting, and Gardens, p. 261), and the walks made in the natural manner there recommended, the ſhrubbery would be a highly intereſting ſcene.

THE PLEASURE GROUND.

THE intention of this is to furniſh agreeable and varied walks as near the houſe as poſſible. It may be a collection of all the kinds of ſcenes which I have mentioned, and of many others properly arranged, and connected by walks leading through the whole, in ſuch a ſucceſſion, that the contraſt of the paſt with the ſucceeding may ſupport the character of each, and at the ſame time preſerve congruity; for the great art in uniting a number of ſcenes in a pleaſure-ground, lies in the nice diſtinction betwixt incongruity and contraſt.

Here may exiſt ſcenes grand, gloomy, romantic, ſoft, ſolitary, ſimple, &c. each of which may be heightened by appropriate buildings, as temples, grottoes, hermitages, root-houſes, cottages, &c. The different kinds of gardens, alſo the various water-ſcenes, and an infinite diverſity of wood and lawn, will naturally be introduced in the pleaſure-ground; in the open ſcenery the walk ſhould direct the eye to views of portions of diſtant country; and after it has been conducted through about one half of the whole pleaſure-ground, it ſhould lead to a proſpect-tower, where, after having already examined ſo much of the parts, we may take a general proſpect of the whole eſtate. This tower will have an excellent effect in many reſpects. Among other things, it will excite curioſity to examine the reſt of the parts of the pleaſure-ground; and as the walk that led hither returns to the manſion by a different courſe, it affords an agreeable opportunity of doing ſo. It is eaſy to conceive how different this would be from the monotony, ſameneſs, and formality of almoſt all modern pleaſure-grounds.

THE PARK.

THE apparent extent of parks depends more upon the variety of the grounds, and the manner in which the trees are planted, than upon the number of acres. A level or uniform ſurface, ſpotted by circular, oval, or even angular clumps, and ſurrounded by a compact ſerpentine belt, as at Blenheim, can never appear extenſive; but a very few acres of varied ground, ſprinkled over with light groups, appear boundleſs. In ſuch a park, every ſtep preſents a new compoſition, ariſing from the varied groups of cattle with the trees, &c.; but there is no permanent mark by which we may diſtinguiſh one ſcene from another, ſo as to know it again; and thus a perſon might wander up and down the extent of a few acres for ſeveral days, without being able to ſay whether he was not traverſing a park of ſeveral ſquare miles. This is the caſe in natural foreſts; and I need hardly obſerve, that they are the beſt examples for grouping and arranging the trees and ſhrubs, &c. in gentlemens' parks.

A FARM.

FARMS may be of two kinds. Firſt, *perpetual paſture*, as the Leaſowes, which, excepting ſome puerilities, as guilt urns, collegiate inſcriptions, &c. was, when properly kept up, a moſt excellent example to copy from.

There are many ſituations that might be

made equal, if not ſuperior to what this farm was, at a very trifling expence; and I think there cannot be a more pleaſing and profitable mode of laying out a ſmall place.

Secondly, *Aration and paſture together*, or what is called commonly, but improperly, convertible huſbandry. So much ornament cannot be beſtowed here with propriety. The ſhrubbery introduced by Mrs Southote at Woburn, has been juſtly reprobated as incongruous with ploughed fields and corn crops. Nor would Mr Shenſtone's mode of varying the fences and conducting the walks anſwer; becauſe much ground would be loſt, and the proper character of arable fields deſtroyed.

The beauty of this kind of farm will conſiſt in the proper cultivation of the ſoil, ſo as that the richeſt crops may be produced—in the ſymmetry of the diviſions and the cut hedges—the general neatneſs and order of all the reſt—and in ſeeing the ſeveral operations

perations of ſeed-time, hay-time, corn-harveſt, &c. going on at theſe proper ſeaſons.

CONCLUSION.

ALTHOUGH a conſiderable part of the OBSERVATIONS ON PLANTING refer to ornament, as well as the foregoing remarks, yet, as I profeſs to differ in my ideas on this ſubject from all other improvers, at leaſt as far as I know from the writings of ſome of them, (as Marſhall, Repton, &c. and the works of others throughout the country), and may have hinted at the difference, and referred to Price's Eſſays and Knight's Poem for the reſt, it may be ſaid, by ſome readers, that my own obſervations are too barren of practical directions. In anſwer to ſuch, I would juſt obſerve, that the improvements which I propoſe to make in the art are almoſt wholly copied from nature; and her variety is ſo great, that an enumeration of the different caſes would be endleſs, and would, perhaps, after all, be more apt to confound than inſtruct. 'Didactic writers are moſt ſucceſsful if they can induce their readers to think for themſelves.'

The eaſieſt, and the moſt complete way, in my opinion, to get a practical knowledge of the art of landſcape gardening, is, after a liberal education, firſt to acquire a tolerable knowledge of agriculture, gardening, botany and architecture, particularly gardening and botany. Secondly, To ſtudy the principles, and follow the practice of landſcape painting. Then to read Price's Eſſays, Knight's Poem, D'Ermeonville's Eſſay, Gilpin's Works, Shenſtone's Remarks, and ſeveral other books on this ſubject. Next, to viſit and make ſketches from the moſt romantic parts of the country. After this time, we may ſuppoſe the artiſt has acquired a juſt reliſh for nature, and a correct idea of the general principles of painting, combined with his practical knowledge of the materials of real landſcape. Now (and not before, leſt his taſte ſhould be vitiated) he may viſit all the beſt improved places, to acquire a juſt notion of convenience in laying out a place. He may then be placed as aſſiſtant to a practical landſcape-gardener; and after he has been there a ſhort time to ſtudy the buſineſs-part of the art, he may commence for himſelf.

Such a courſe of education would lead a landſcape-gardener and planner of improvements to think for himſelf. His guides at all times would be NATURE and UTILITY; and in every caſe which might occur in the courſe of his practice, he would blend them together in ſuch a way as would beſt accord with the character, ſituation, and the given circumſtances of each particular place or ſcene.

OBSERVATIONS

ON

A NEW MODE OF GAINING AND EMBANKING LAND FROM RIVERS OR THE SEA.

IN CHINA, TWO OF THEIR FINEST PROVINCES ARE GAINED FROM THE SEA. WHAT HAVE NOT THE DUTCH DONE BY DAMMING OUT ITS FURY?

BERNE SOCIETY'S ESSAYS.

KNOWLEDGE IS POWER.

LORD BACON.

OBSERVATIONS

ON

A NEW MODE OF EMBANKING LAND FROM THE SEA.

THE art of gaining land from the ſea, or of embanking land already gained, (but liable to be frequently or occaſionally overflowed by extraordinary tides), ſeems but little underſtood in Great Britain. Few embankments have been made, and thoſe few generally conſtructed by men ignorant of the principles upon which their *strength* and *duration* depend. It is not my intention, however, to inveſtigate the numerous reaſons that have contributed to the failure or inſufficiency of particular embankments: theſe are ſeverely enough felt by the individuals who have conſtructed them. I ſhall briefly point out the general cauſes of failure—the proper forms of embankments, and the materials which compoſe them—and ſhew alſo a new method which I have invented of preſerving them from the ſea while building. By means of this invention, embankments may be ſafely conſtructed in ſituations where they could not otherwiſe be attempted; and thus, an immenſe quantity of land may be *gained* from the ſea in places where it is at preſent thought impoſſible.

It deſerves to be remarked, here, that there is a wide difference betwixt *preserving* land already partially left by the ſea, and actually *gaining* land from the bottom of the ocean. What is generally termed embanking, in our iſland, applies entirely to ſome ſea-dikes which have been made in order to exclude the ſwells of rivers in the time of floods, or to defend low lands near the ſea from extraordinary tides. To gain, and preſerve dry, a large portion of the bed of the ocean, and turn it to the purpoſes of agriculture, is a thing which has ſcarcely been thought upon, and never yet practiſed in Great Britain. I truſt the obſervations which follow will ſhew the propriety and practicability of attempting this object; and I truſt the embankments which I am about to execute for ſome gentlemen will in two or three years put it beyond all doubt.

SECTION I.

OF THE CAUSES OF THE FAILURE OF EMBANKMENTS.

THE general cauſes of failure are two. The firſt cauſe concerns the *form* of the embankment; and the ſecond the *materials* with which it is conſtructed.

1. With reſpect to *form*. They are generally made too narrow at the baſe, in proportion to their height; by which means, the ſide next the ſea is too upright (as is repreſented in Plate IX. fig. 1.) Hence, it is unable to withſtand the weight of the ſea in

high tides, which, it muſt be remembered, preſs laterally as well as downwards. Another very bad conſequence of this form is, that the tides, in ebbing or flowing, act a longer time on one place, than if the ſlope were more gradual; and, conſequently, they have a much greater tendency to break or damage the ſurface of the bank.

Moſt part of the embankments that have been conſtructed in England are of this form, more or leſs varied, and the materials generally of earth or turf. Bays or creeks are the moſt favourable ſituations for this kind. There, if they endure until the ſea leaves ſand or mud againſt them, ſo as to form a gradual ſlope next the ſea, (ſhewn by the dotted line *a a*, fig. 1.) they may anſwer very well; but in the ſituations where they are commonly placed, the ſea is very frequently making breaches in them, which are with much difficulty filled up; and if this work be for a very ſhort time neglected, the whole embankment is broken down.

2. With reſpect to the *materials*, it is of little conſequence what the body of the embankment is conſtructed with, provided thoſe uſed on the ſurface next the ſea be of the proper kind.

Where the ſlope next the ſea is ſuch as ſhewn in fig. 1., no material, that is not equal in effect to cloſe-jointed pavement, will be complete. Earth, turf, ſand, ſhells, gravel or common cauſeway, are all liable to be damaged by the beating of the tide. Cauſewaying is much inferior to a good coat of gravel. Even although the ſlope were conſiderable, ſtill it does not reſiſt the action of the ſea. The water enters at the crevices—ſinks down among the ſtones—looſens the clay or earth below—part of it is divided and carried off every tide—vacuums are formed below—one ſmall ſtone ſinks from the reſt—a larger ſucceeds (which gives more room for the operation to go on)—ſome of the ſurface-ſtones follow—and the ſea, now ruſhing in with violence, ſoon diſplaces the reſt, and ruins the embankment.

This is almoſt always the caſe with heads thrown acroſs rivers, or cauſewayed banks, made to preſerve bold ſhores apt to be waſhed away or undermined by the action of water. For they have ſeldom been properly built with mortar, and pointed with ſtrong cement, or built with aſhler very neatly jointed, either of which are ſufficiently durable.

Notwithſtanding theſe general cenſures on embankments, there are particular exceptions, which anſwer the purpoſe in the completeſt manner. Thoſe made of earth, in ſome places in England, are 100 feet broad, and only 12 or 14 feet high; and theſe have always been proof againſt the tides. Some quays are built with mortar made from powdered unburnt limeſtone and coarſe ſand, and pointed with puzilana earth; and theſe reſiſt the ſea like ſolid rock. But the general errors which I have noticed, have been ſufficient to raiſe numberleſs objections against the propriety of making embankments, and have (very properly indeed) deterred many from attempting to gain land from the ſea.

Another great obſtacle, although thoſe already noticed were removed, is the difficulty, and conſequently the expence of conſtructing them. The ebb and flow of the tide follow each other ſo rapidly, that workmen have but a very few hours every day to proceed with their operations, which both loſes much of their time, and injures the work as it is going on. I may add, too, that this circumſtance always prevents the embankments from being extended ſo far into the ſea as they might be, and thus often prevents many thouſands of acres from being gained. But theſe and other evils, I hope, will ſpeedily be removed, from the uſe of the barrier which I have invented, and the modes of conſtruction which I recommend.

SECTION I.

OF THE MOST SECURE NATURAL SHORES AND BANKS OF RIVERS, AND THE CAUSES OF THEIR SECURITY.

In examining the ſea ſhore, or the banks of rivers, we uniformly find, that the leaſt liable to be damaged are ſuch as have a gentle, eaſy ſlope from the bed of the ſea or river to the top of the ſhores (as Plate IX. fig. 2. *a.*), or ſuch as are compoſed of ſolid perpendicular rocks (as fig. 3.); both which kinds I ſhall conſider ſeparately.

1. The *ſloped banks* on the ſea-ſhore are

leaſt liable to accident from the ſurge and high tides, when they are covered with a coating of ſand or gravel. Thoſe on rivers are beſt defended from extraordinary floods when they are uniformly covered with cloſe paſture graſs to the edge of the water.

The *strength* of theſe banks depends upon the length of the ſlope,—their *durability* on the uniformity of its ſurface,—one part not being rougher or harder than another.

From the *length of the slope*, the river, as it increaſes or decreaſes, and the tides, as they ebb and flow, act but a ſhort time on one part of their ſurface. The greater the weight of water on the bank, the more it is preſſed down, and the firmer it is rendered.

From the *uniformity of the surface*, the water acts with the ſame power on one part as on another. Were a few ſtones or buſhes diſtributed on it, the water would form eddies round them, each of which would ſoon become a large hole. If the ſurface be

harder

harder in one place than another, a ſimilar effect will be produced.

2. Bold, perpendicular, rocky ſhores are always backed by earth or other rocks (as repreſented in the Section, fig. 3.); and it is evident, that their *ſtrength* conſiſts in the reſiſtance of this accumulation of materials, not in their diſpoſition, as in the other kind. Their *durability* conſiſts in the compactneſs and uniform texture of the rocks on the ſide next the ſea. If it be full of clefts, or if ſome parts of it be of a ſofter nature than others, the ſea in time will enter theſe, and break down the bank more or leſs, according to theſe circumſtances.

SECTION II.

OF THE MODES OF IMITATING THESE FORMS BY ART, OR OF IMPROVING UPON THEM.

1. In many places in almoſt every ſea-coaſt, we ſee ſhores of the firſt kind (fig. 2. *a.*); and it will not be denied, that if a trench were cut down behind one of them, as repreſented in this figure by the lines *b b*, the bank or ſhore, though now detached as it were from the land, would be equally ſtrong and capable of reſiſting the preſſure of the ſea as before. This being granted, it follows, that if this bank or mound were moved and placed two or three miles from

ſhore, within the bed of the ſea, as at *c*, it would be as ſtrong as ever, and no more liable to be broken down by the water, than when in its former ſituation; and that, here, it will as completely guard the ſea from the intermediate ſpace of two or three miles, as it formerly preſerved it from the bottom of the trench *d*, of three or four feet wide.

2. Shores of the ſecond kind, fig. 3, more or leſs perfect, abound in moſt ſea-coaſts. The cauſe of their ſtrength and duration has been already noticed. They cannot be wholly imitated with advantage; but excellent hints may be taken from them for defending bold, abrupt, broken ſhores compoſed of earth, or of earth and rocks mixed. It will at once occur, that building a perpendicular wall of good ſtone, againſt broken abrupt ſhores, will make them nearly as ſtrong and durable as the natural ones,

which are compoſed of perpendicular, ſolid rock (See fig. 4.)

Walls built thus are of great uſe in defending abrupt ſea-ſhores. They are not ſo generally applicable to rivers; becauſe there, the water, in time of floods, requires room to ſpread; and this is the great uſe of ſloping their banks;—but this mode, by confining it on every ſide, would only tend to make it do more damage than before. There may be caſes, however, where it is deſireable to defend one part of the banks of a river without ſloping them, or to defend one bank at the expence of that oppoſite; and here it may be uſed with propriety,—although piers properly made in ſuch places are often more complete, and always more economical.

Betwixt theſe two kinds of banks, which are natural, art may contrive one, which ſhall anſwer ſome of her purpoſes better than either.

1. In place of collecting ſuch a quantity of earth or other materials as will be neceſſary to form a bank ſimilar to fig. 2. it may be more economical to make one ſuch as fig. 5. (Plate IX.); the ſide next the ſea forming an angle with the baſe of 45 degrees. This will bear all the weight of water that can poſſibly be put on it, equally well with fig. 2. only the action of the tides would break the ſurface of the ſide next the ſea, which we may contrive to prevent, by coating that ſide with the durable material in the natural kind, fig. 3., or, in other words, paving it with flagſtone or bricks.

2. Betwixt this and the firſt natural kind, a great variety may be contrived, differing only in the degree of ſlope next the ſea; that which has the greateſt ſlope, as fig. 2., being coated over with ſand or gravel; that which has the leaſt ſlope, as fig. 5., coated over with pavement; and the intermediate

ſlopes coated with materials between the two extremes, as coarſe gravel, chalkſtone, brick, &c.

In nature, we ſee the great power of projecting points on the ſea or rivers, either upon a great ſcale, as promontories defending bays and inlets, or upon a ſmall ſcale, as rocks, roots or ſtones, defending parts of the banks of rivers, by throwing the current to the oppoſite ſide. This naturally leads us to the idea of piers, which are of great uſe in defending embankments. They may generally be made and coated over with the ſame material as the embankment itſelf; but often compoſed of bruſhwood faſtened to ſtakes with a much better effect. Often a ſimple fence of rude wicker-work, (called in many places ſtake and rice) three or four yards long, will be ſufficient. Stone embankments often form eddies below them; but fences of bruſhwood cannot have this effect. They have the ſame mild effect in checking the rapidity of water, that a hedge has in ſoftening a current of air.

Indeed, in ſome very ſandy ſhores, embankments may be made entirely of wicker-work. Three or four rows may be made of different heights, and the intervals betwixt them filled with furze, bruſhwood, or ſtraw, &c. (See Plate IX. fig. 6.) Theſe materials would retain the ſand as the tide paſſed through; and in a very ſhort time an embankment would be made in the form of the dotted line *ff*, which ſhould then be planted with the elymus arenarius to bind it, and at extraordinary tides it would continue to attract more, until at laſt it was raiſed above their reach. I know ſeveral places where from twenty to fifty thouſand acres could be gained by this mode in a few years!!

Whatever kind of embankment is conſtructed, proper ſluices and tunnels, with valves next the ſea, ſhould be placed here and there according to circumſtances, to allow the water collected within to paſs off, and to admit the ſea at pleaſure, either for the ſake of depoſiting ſand or mud to raiſe the ſurface of the land gained, or to flood the ſoil, in order to produce ſalt, merſe, &c. &c.

SECTION III.

OF THE MATERIALS WITH WHICH EMBANKMENTS ARE CONSTRUCTED.

THE perpendicular kind of embankment, fig. 4., for defending abrupt ſhores as already mentioned, is ſimply a wall, which may be good brick-work, rubble-work, or aſhler. The mortar uſed ſhould be of the ſtrongeſt kind, and they ſhould, generally ſpeaking, be pointed with puzilana earth, or Roman cement. *

The ſloped embankments may be made of common earth, clay, mud, ſtones, or a mixture of theſe; or any materials which will

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* Prepared by Parker & Co. London.

will form into a ſolid, compact maſs. The ſide next the ſea of ſuch as fig. 2., which forms an angle of twenty degrees, or any ſide forming an angle betwixt that and thirty-five degrees with the baſe, may be covered with ſand, ſea-ſhells or gravel, from the natural ſhores; or ſtones may be broken of uniform ſizes, about three pounds weight each, and uſed in the ſame way; or, ſhould either of theſe not be had in ſufficient quantity, it may be covered with mats of reed, ſtraw or bark *, which require to be renewed frequently; or, it might be defended by a fence of bruſhwood placed upright all along the bottom of the bank, and of the ſame height, which tends to break the force of the waves; or the whole face of the bank might be covered with bruſhwood, either in bundles or as wicker-work, or neatly laid on and fixed down with long poles and ſtrong hooks, as ſhewn Plate X. fig. 7. It might be

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* As is done in Holland.

be cauſewayed with ſtones and moſs—or moſs might be ſpread on the bank, and then covered with wicker-work—or moſs might be wrought into the wicker-work, and then theſe moſſy covers neatly laid on and pinned down, which mode would laſt a very long time *—or by a thouſand other ways, ſome of which would require no attention, as gravel, ſtones, &c.—or by others that would require conſtant attention and occaſional renewal, as ſtraw, matts, bruſhwood, &c.

The ſide next the ſea, of ſuch as fig. 5. Plate IX., which forms an angle with the baſe of forty-five degrees; and all the variety of ſlopes betwixt that, and thoſe where the ſlope may form an angle of thirty-five degrees, may be covered with flagſtone, jointed with powdered, unburnt limeſtone, puzilana

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* Plants of moſs in their living ſtate are meant here; ſuch as the ſphagnum, bryum, hypnum, &c. —not mere peat.

puzilana earth, or Roman cement: or, if flagſtone cannot be had, clay may be found, and bricks of proper kinds may be made, and uſed in the ſame manner as ſtone.

In the ſlopes betwixt forty and thirty-five degrees, it will often be more economical to cover with ſtones about ſix or eight pounds weight, laid on eighteen or twenty inches deep; or with a bed of moſs of three inches, or peat-moſs * of ſix inches thickneſs, laid on the bank, and then a covering of ſimilar ſtones of only ſix or eight inches thick: or theſe ſtones may be cauſewayed, or laid in ſtrong clay, and their ſurface painted or plaſtered over with lime, or ſtrong cement of any kind that will harden quickly, and endure the action of the tides and the air, which will operate upon it alternately, &c.

Caſes may occur where it will be moſt economical to cover the ſide next the ſea with

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* That kind called the flow-moſs will anſwer beſt.

wood, ſuch as the larch (*alone*) or any other wood coated over with pitch and ſharp ſea-ſand. Even old ſail-cloth or oil-cloth, pitched and ſanded, and then neatly laid on, will anſwer as completely as pavement during a certain time, although theſe materials will fail a great deal ſooner. In ſome caſes it may be requiſite to cover it with a metallic ſubſtance, as ſheet-lead, or tinned copper plates; or by a great variety of other ways, of various rates of expence, and different degrees of duration.

MBANKMENTS PL. IX.

Sections

Fig. 1.

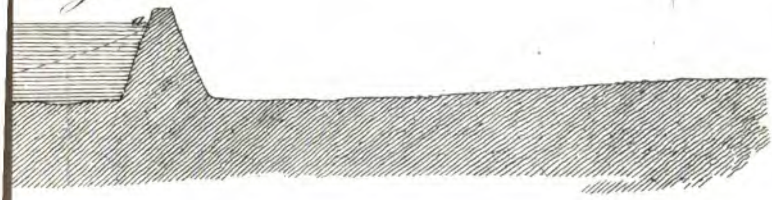


Fig. 2.

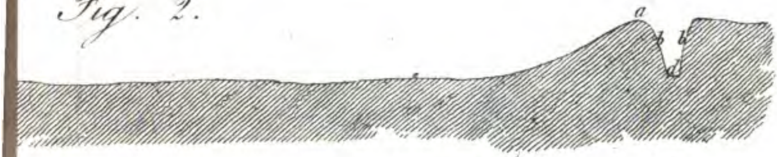


Fig. 3.

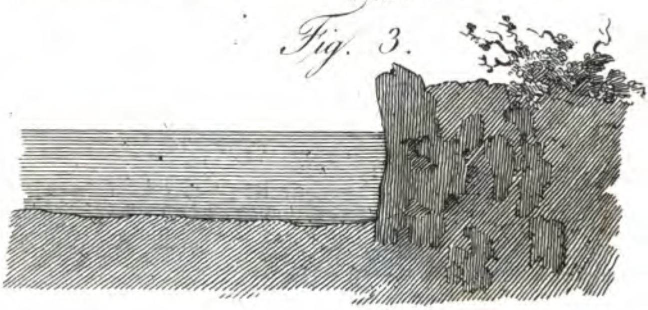
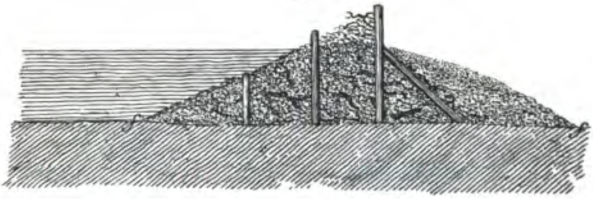


Fig. 6.



F.Lamb Sculp

Face P.322

SECTION IV.

OF PRESERVING EMBANKMENTS FROM THE SEA WHILE THEY ARE CONSTRUCTING, SO AS THE WORKMEN MAY GO ON WITH THE WORK, INDEPENDENT OF THE EBBINGS OR FLOWINGS OF THE TIDE.

THE inconveniences which ariſe from the ſea retarding the progreſs of building embankments, have been already noticed; and the bad conſequences pointed out, as increaſing expence in the firſt inſtance, and, in effect, preventing many thouſands of acres of valuable land from being gained. I proceed, now, to deſcribe the barrier by which all theſe diſadvantages may be removed.

Let triangular truſſes of wood, ſuch as

Plate X. fig. 8. be prepared and placed at low water, ſurrounding a part of the foundation of the propoſed embankment, in the form ſhewn (fig. 9.) where the truſſes are placed as the dotted lines *c c*, &c. the hypothenuſe or ſloping ſide of the truſſes fronting the ſea all round, which ſide is next to be covered with boards, ſay about five feet broad, twenty long, compoſed of deals neatly joined; and one board is placed upright from *a* to *b*, fig. 8. to prevent the ſpray from coming over: or, the truſſes being placed and fixed upright by croſs rafters, the whole may be laid over with ſingle deals, without being cloſely joined, and then covered with oiled canvaſs or pitched ſailcloth neatly faſtened on, and cemented at the joinings with a compoſition made of tar and clay: and this will be a more economical mode.

The barrier being thus conſtructed and placed, it is evident that, as the tide flows, the water will ſurround it; and the higher it riſes on it, provided it does not riſe higher than *a*, which ought to be made fifteen or ſixteen feet high (about the general height of ſpring tides), it will only preſs it down the more, and render it firmer than it would be if only half of it were covered with water.

If the embankment is to be made of clay or earth, or the ſame materials upon which it is founded, a ſpace muſt be encloſed of ſufficient width to allow theſe to be dug out from the land ſide of the bank, as in fig. 9.; or, if it is to be wholly built of ſtone, or any diſtant material, theſe may be laid down beſide or upon the ſpot to be built on, before it is ſurrounded by the barrier.

When the length of wall contained within one of theſe encloſures is finiſhed, the barrier muſt be moved along, ſo as to take in another ſpace, which muſt be built upon as before. The barrier muſt then be again taken down and replaced, &c.; and ſo on, until the whole line of embankment is finiſhed.

The original expence of this barrier may be from one hundred pounds to four hundred pounds, and it may be moved and replaced for twenty or thirty ſhillings each time; and as the wood of which it is made will generally be of conſiderable value after the bank is finiſhed, the total expence of this barrier will not be ſo great as at firſt ſight may be imagined.

By means of this barrier, it is evident that embankments may be made as far out as the ſea retires; and, even beyond that, buildings of any kind may be conſtructed within it with eaſe and ſafety. The only additional expence, when the barrier was placed *among* water, would be that of pumping it out, which could eaſily be accompliſhed by a windmill, or any other ſuch ſimple contrivance.

But caſes may occur, where almoſt no other embankment can be made but one compoſed of theſe truſſes and planking. There are many thouſands of acres of valuable ſhelly ſand and mud, on the coaſt of England, that in its preſent ſtate could not properly bear the weight of any heavier bank or building, but which could eaſily bear the weight of this. Such ſands might be gained by the barrier alone for a very trifling expence; and, after being gained a few years, they would become ſufficiently dry and hard to bear the weight of any ſpecies of permanent bank or mound.

The truſſes and planking, in this caſe, ſhould be well pitched. Two piles ſhould be driven into the ſand, under the ſpot intended for each truſs. One plank ſhould be laid acroſs theſe; and then ſeveral thinner planks laid on, in a direction parallel to the embankment; and upon theſe laſt the truſſes ſhould be placed exactly above the piles. The uſe of the piles is to prevent the embankment (or barrier) from being moved away, or by any accident floated; and the uſe of the thin planking is to prevent it from ſinking into the ſand with the preſſure of the ſea. The whole of this work could eaſily be finiſhed from flat-bottomed boats.

In this way, many ſand-banks and ſhoals of mud that are at preſent dangerous nuiſances, might be rendered uſeful paſture, meadow, ſalt merſe, reed *, or flag † grounds.

A barrier of this kind might eaſily be conſtructed acroſs rivers, to collect the whole body of water, and raiſe it to any height, for the purpoſes of machinery. It might be ſo contrived, as, with very little trouble, to be lowered in times when the water was abundant, and raiſed in ſeaſons when it was more

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* The *arundo*, uſed by weavers, and for roofing.

† The *typha* or *cats-tail*, uſed by coopers.

more ſcarce; and in times of great floods, by having hinges on the baſes of the truſſes, and alſo on the lower edge of the ſloping ſide of the barrier (as at *c* in fig. 8. Plate X.), the whole might be laid flat over on the channel of the river, and would thus be no obſtruction to the flood. Again, as this flood went off, the barrier might be raiſed at pleaſure.

This ſcheme, if adopted, would ſave a vaſt of money frequently thrown out for heads or dams for driving machinery; * and it would anſwer the purpoſe much more completely, by giving the full command of all the water contained in the river.

PIERS or QUAYS for defending the banks of rivers, or altering their current, might alſo be conſtructed of this kind of barrier at a trifling expence; and they would have this advantage over a ſtone one, that they might be eaſily moved from one ſituation to another when it might be found neceſſary.

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* As at Stormontfield in Perthſhire, where 60l. would have ſaved 6000l.

In many caſes, alſo, where piers, quays or harbours are to be built for the uſe of ſhipping, &c. by ſurrounding the whole with a barrier of this kind, a very conſiderable proportion of the expence would be ſaved.

Indeed (the nature of this barrier being properly underſtood) it is applicable to a vaſt number of uſeful purpoſes, which the fertile mind will eaſily foreſee. As for thoſe whoſe ideas are contracted, and whoſe incredulity reſiſts every new ſcheme, it is needleſs to ſay any thing. What has already been advanced will appear abundantly ſpeculative.

SECTION V.

OF THE EXPENCE OF MAKING EMBANKMENTS.

ALTHOUGH the expence of embanking is conſiderable, it is not near ſo great as is generally imagined. It is, however, impoſſible to ſay any thing perfectly exact under this head, unleſs certain *data* were given; but, from the various calculations and eſtimates which I have made for various places of the iſland,* I find that a dike of earth covered with gravel or ſand, ſuch as fig. 2. Plate IX. will coſt from threepence to eightpence per cubic yard;—ſuch as are of a more ſteep ſlope, ſay from thirty-five to forty-five degrees, and covered with pavement, from ſixpence to one ſhilling per cubic yard; the kind, fig. 4., from ten pounds to twenty-five pounds, per rood of thirty-two yards. The barrier recommended for ſoft grounds, which, at firſt gaining from the ſea, will not bear the weight of a wall, may be from ten to thirty ſhillings per lineal foot. The one compoſed of bruſhwood, or ſtake and rice, from ſixpence to five ſhillings per lineal foot.

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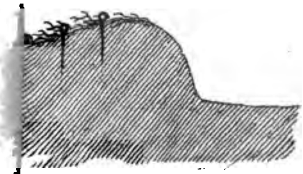
* Partly for my own information, and partly for proprietors, as Lord Keith, the Earl of Selkirk, &c.

In the deſign and eſtimate I made for Lord Selkirk, upwards of 5000 acres of mud (which in two or three years would equal the beſt carſe land) were propoſed to be gained for 50,000l.; and were it not for a large river, the Bladenoch, which interſects this ſhore, the ſum neceſſary would not exceed 30,000l. This caſe, however, is not near ſo favourable as many ſhores which I have ſeen.

ANKMENTS Pl. X.

7.– Section.



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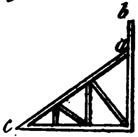
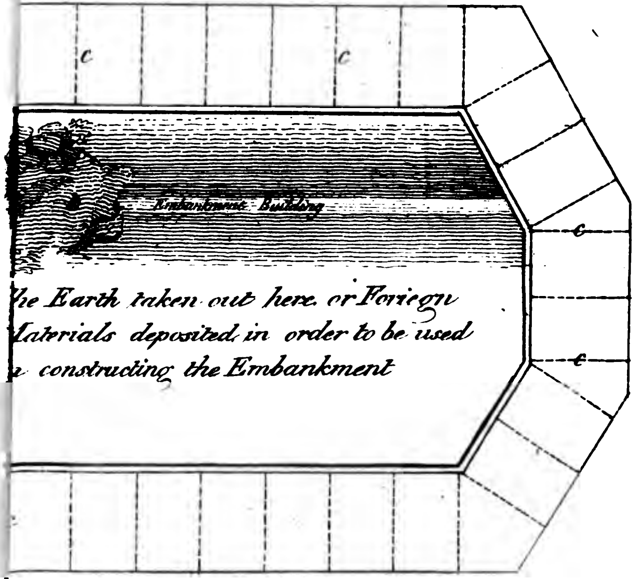


PLAN of the BARRIER

Invented by J. Loudon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F Lamb Sculp

Face P.332.

SECTION VI.

OF THE MANAGEMENT OF LAND GAINED FROM THE SEA.

THE principal difficulty, here, will be to keep off the water of the rills or rivers that may come from the ſurrounding lands, and to deliver to the ſea the ſurface water collected from the land gained; but theſe objects can be eaſily accompliſhed by the following means.

It will frequently happen that a river will run through the grounds to be embanked. This is the moſt expenſive and difficult caſe which can occur; but it is only neceſſary to carry an embankment along each ſide of it to the ſea; and there, where it interſects the other line of embankment, to place a flood-gate *, which ſhall prevent the tide from entering, except when it may be neceſſary to admit veſſels, and which ſhall allow the water of the river to paſs into the ſea.

Small rills and ſprings may either be turned along the margin of the land gained, and let out at one end of the embankment, where it joins the land, or led the moſt convenient way to one or more of the valves or flood-gates which it is neceſſary to make in all embankments for excluding the water within.

The water collected on the ſurface of the land gained, will generally be let off by the flood-gates or valves already mentioned; but where the embankment is extended into the water, this cannot be the caſe, as the level of the ſea will generally be above the level of

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* Such a gate may be ſeen at Linn, Norfolk.

of the land. In this caſe, windmills for driving pumps muſt be placed at proper diſtances, according to the particular caſe. Perhaps, in general, one ſmall windmill driving four pumps, will be ſufficient for draining 1000 acres. This will not coſt above thirty or forty pounds.

By making a ſmall embankment of two or four feet high ſome diſtance within the large one, all the water collected betwixt that and the original ſhore would be accumulated, and it might be led in a raiſed canal in the ſame level to a flood-gate in the outer embankment. This would leave very little water to be drawn up by the pump; and, in this way, though 20,000 acres were gained, one windmill only would be neceſſary. *

In many caſes, and indeed in moſt caſes, in place of a windmill, the rills or ſprings collected

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* As I propoſed in the Deſign, &c. for Wigton Bay.

collected within might eaſily be made to turn a water-wheel, which would be a more permanent thing than to depend entirely on the wind.

Or the ſea, at the flow of the tide, might eaſily be made to enter a baſon, and, at the ebbing, it might drive a draining-wheel: or a great many other methods might be ſucceſsfully adopted.

Thus, in land gained from the ſea, there cannot be any difficulty in preſerving it from water, from whatever quarter it may come.

When the land to be gained is covered (more or leſs) with ſtones, theſe ſhould be put in flat-bottomed boats at low water; and when the tide floats them, they ſhould be rowed to the propoſed line of embankment, and then dropt. This mode of conveyance will generally be found the moſt economical with all the ſolid and diſtant materials.

When the ground is ſandy or poor above, and clayey, or reckoned of a better quality below, it may be trenched (with the plough) of ſuch a depth, as to turn up the good, and bury the bad ſoil. * If the ſoil be thin, and even rocky, it may ſtill be rendered valuable. The moſt rocky parts may be covered five or ſix inches with ſoil, and the whole ſown either with meadow graſs, to be flooded with freſh water, and kept as meadow ; or with other graſſes, as the juncus bulboſus †, &c. and kept as ſalt marſh.

When mud of a good quality and conſiderable depth is gained, it may in ſome caſes be deſireable to ſummer-fallow it for one or more ſeaſons after it is embanked. At other times, it may be better to ſow it with rapeſeed for the firſt ſeaſon, and to ſummer-fallow it the next, as preparatory for a corn crop, &c.

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* This caſe occurred at Aberlady, Eaſt Lothian.

† The graſs that generally compoſes ſalt marſh paſture.

No kind of land can be gained from the ſea but what is of great value, from this ſingle circumſtance, that it can be flooded moſt generally by freſh water and by the ſea at all times. By flooding, the moſt barren ſand or rock with only an inch or two of ſoil, will bear excellent paſture. Indeed, much of the ſand that is often reckoned barren and uſeleſs, is mixed with broken ſhells, and, upon examination, will be found to contain two or three parts in ten of calcareous earth. Moſt of the large rocks within ſalt water mark are ſo fragile on the ſurface, as to be eaſily penetrated by the roots of graſſes, and more particularly after they have been expoſed a year or two to the action of the air alone. I do not mean, here, the large detached ſtones that we often meet with within water-mark; theſe I ſuppoſe either buried in the ground, or boated off as before mentioned.

SECTION VII.

CONCLUSION.

WITH reſpect to the quantity of land which might be gained from the ſea or rivers, by embanking in the above way; I have only to ſay to individual proprietors adjoining ſhore lands of every deſcription, that nothing more is neceſſary than to obſerve how far out the ſea ebbs at the loweſt ſpring tides, and they may ſafely conclude that it is in their power to gain and preſerve every inch of land uncovered by the water at that time, and that ſuch land, when gained, will be of equal, if not ſuperior value, to the beſt parts of their eſtates. With reſpect to the quantity which might be gained throughout the whole iſland, I could not exactly ſay; but I think it cannot be leſs than three millions of acres. I have ſaid little, in the foregoing pages, reſpecting the modes of defending the banks of rivers, or altering their courſe; but if the general principles noticed be properly applied, many great advantages will ariſe to proprietors. I know ſome eſtates that loſe, from the encroachments of rivers, ſeveral acres annually, which five or ten pounds, judiciouſly and timeouſly applied, would completely prevent. The advantages that ariſe from placing proper flood-gates on the mouths of rivers which the tide enters, are very great, as may be ſeen in ſeveral places in England. *

In embanking land from rivers, one great advantage is, the deepening of their courſe

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* See Marſhall's Management of Landed Property.

courſe, by which veſſels of a larger ſize than formerly may be admitted to traffic in them. This is a well known fact, and it is of conſiderable importance.

It may be obſerved, that as embankments are made here and there on the ſhores of rivers or the ocean, the ſpaces betwixt theſe will thus become as bays; and quantities of ſhells, mud, ſand or gravel, will ſoon be depoſited there by the tide; ſo that theſe, however unfit for being embanked at firſt, will in the courſe of years be as fit as natural bays and creeks are at preſent. Thus, many rivers which, in their preſent ſtate, are eight or ten miles wide at their junction or influx with the ſea, may, in the courſe of years, be only two or three furlongs.

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